

**Sonos, Inc.’s Opp’n to Google LLC’s
Motion *In Limine* No. 1**

EXHIBIT D
(Filed Under Seal)



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**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA**

CIVIL ACTION NO. 3:20-CV-06754

**GOOGLE LLC,
v.
SONOS, INC.**

SUPPLEMENTAL EXPERT REPORT OF JAMES E. MALACKOWSKI

December 9, 2022



the cloud-based media service; and (iii) play back the retrieved at least one media item,” as required by limitation 1.7/12.4.

*Nevertheless, especially given that Google represents that the prior art that appears to operate in a similar manner as these apps is relevant to the '033 Patent, it is my opinion that, while they may be inferior to the '033 Patent, these apps are all technologically comparable to the Direct Control technology claimed in the '033 Patent.*⁴²⁹

I understand that Dr. Schmidt has opined that these apps are technically comparable to the technology claimed in the '033 Patent, albeit less valuable. This is due to the fact that, like the prior art, these apps do not perform each and every limitation of the independent Asserted Claims of the '033 Patent.⁴³⁰

Since the main feature being provided by these third-party comparable casting applications is the cast feature, there is no additional meaningful apportionment to be made to the one-time subscription fees that these applications charge. In other words, to the extent that these comparable casting applications have any additional features, they are ancillary to the core casting feature of each application and offset by the advantageous features of the '033 Patent that each application is missing.

Thus, no further apportionment is necessary. And lastly, while the fees ranged greatly between the third-party applications, I have conservatively assumed that a \$1.99 subscription fee would be the quantitative indicator that Sonos and Google would consider based upon the available third-party comparable applications. By picking a fee in the middle of the range, I have further accounted for the secondary benefits, if any, that these casting applications may have over the '033 Patent.

12.2 The Income Approach

The Income Approach provides a systematic framework for estimating an asset's price based on the value of the benefits derived from the use of that asset. As described in Economic Damages in Intellectual Property:

*The income approach is a method used to value intellectual property assets based on the present value of the future income stream generated by an asset. There are three major inputs to the income approach: (1) expected future cash flows from the asset; (2) economic life of the asset; and (3) business risk associated with the realization of the cash flow stream. The key goal is to estimate the present value of incremental profits generated by the asset over its economic life, taking into account the risk associated with generating those profits. Once the present value of the incremental profits is determined, these profits are split in some manner between the licensor and licensee, typically in the form of a royalty.*⁴³¹

As discussed throughout this report, I understand that the Asserted Patents provide valuable features to the Accused Instrumentalities. While there is a lack of relevant comparable license agreements in this matter which read on the value of these specific features, I have been provided with information relevant for the Income Approach which would be considered by the parties to the hypothetical negotiation in this case.

⁴²⁹ Opening Schmidt Report, pp. 165-166.

⁴³⁰ Opening Schmidt Report, p. 166.

⁴³¹ Slottje, D., “Economic Damages in Intellectual Property,” pp. 291-293.



While the income approach seeks to value intellectual property based on the present value of the future income stream generated by the asset, I understand that Google has generally not garnered gross profits on the sales of the physical hardware devices which enable Google's infringement. Over the infringement period, with respect to the '033 Accused Pixel Instrumentalities, from September 15, 2020 through Q3 2022, Google has generated [REDACTED] in net revenue, but lost approximately [REDACTED] in gross profit.⁴³² Google has not provided sufficient financial information to calculate net revenue or gross profit associated with the '033 Accused Instrumentalities more generally.

With respect to the '885 Accused Instrumentalities, from November 24, 2020, the start of the damages period, through Q3 2022, Google has generated [REDACTED] in net revenue but lost approximately [REDACTED] in gross profit on sales of the '885 Accused Instrumentalities.⁴³³ Google has not provided sufficient financial information to calculate net revenue or gross profit associated with the '966 Accused Instrumentalities.

However, Google's losses on actual hardware sales of these devices do not represent value associated with the technology in this case, because as discussed further in Sections 14.11, Google is more focused on increasing the time users spend on Google applications and services such that Google generates more revenue from additional viewed advertisements and subscriptions. Therefore, the main value driver in Google's sales of the Accused Instrumentalities is the inclusion of a user in an ecosystem which generates added benefit beyond the initial sale of a hardware device through additional advertising and subscription revenue, which potentially could continue throughout a user's lifetime.

In fact, it is acknowledged publicly that companies like Google and Amazon are focused on getting smart speakers in front of as many consumers as possible and increasing market share, even realizing losses on the sale of the devices themselves.⁴³⁴ Particularly, Google and Amazon "are eager to give consumers a taste of their respective digital assistants, Alexa and Google Assistant, at impulse-buy prices, hoping to lock in customers and profit from later sales of goods and data about buying habits."⁴³⁵ According to *9to5Google*, a publisher focusing on Google related news, millions of Google Home devices were sold during the 2018 holiday season and it was considered "another record year."⁴³⁶ This is particularly interesting given that, according to Google's financial data, Google lost approximately [REDACTED] in gross profit on sales of the Google Home device in Q4 2018.⁴³⁷ This reflects Google's interest in selling more units and retaining users

⁴³² Appendix 8.6. I note that the damages period starts on September 15, 2020, so I pro-rate the Q3 2020 '033 Accused Instrumentalities Gross Profit for September 15 through September 30, 2020.

⁴³³ Appendix 8.4-S.

⁴³⁴ Kinsella, B., "Amazon and Google Lost Money on Discounted Echo Dots and Google Home Minis," *Voicebot.ai*, <https://voicebot.ai/2018/01/05/amazon-google-lost-money-discounted-echo-dots-google-home-minis/>.

⁴³⁵ Nellis, S., and Paresh, D., "Amazon and Google probably lost money on their smart speakers over Christmas," *BusinessInsider.com*, <https://www.businessinsider.com/amazon-and-google-probably-lost-money-on-smart-speakers-over-christmas-2018-1>.

⁴³⁶ Li, A., "Google Assistant will soon be available on 1 billion devices as Google Home had 'record' 2018," *9to5Google*, <https://9to5google.com/2019/01/07/google-assistant-1-billion-devices/>.

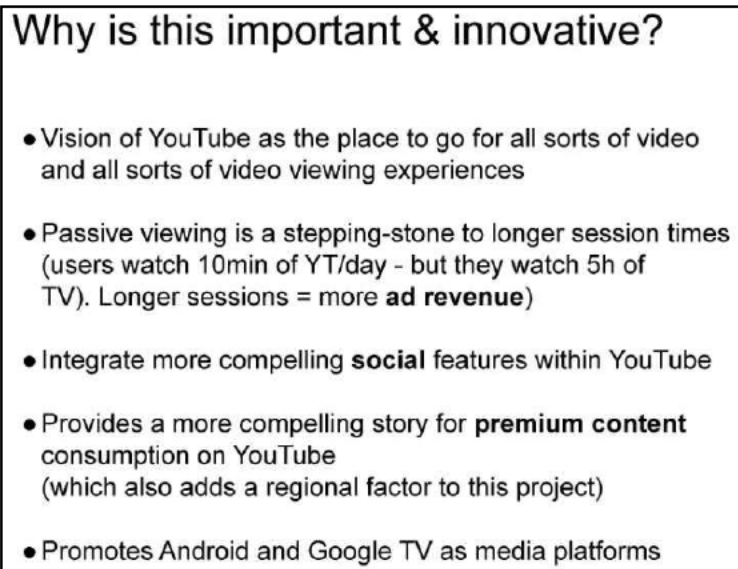
⁴³⁷ GOOG-SONOSNDCA-00117797.



on those units for longer to generate revenue and profit from other means, such as advertising and subscriptions.

This is further corroborated by internal Google documents regarding YouTube which state that longer session times are equated with more advertising revenue.⁴³⁸ Christopher Chan corroborated this idea in his testimony, stating that “it seems to be the case that more YouTube users there are, the better it is more the YouTube service.”⁴³⁹

Figure 20: Longer Sessions = More Ad Revenue⁴⁴⁰



Therefore, as a starting point for the Income Approach in this case, it is my affirmative opinion that a quantitative indicator for the value of the Asserted Patents should be based upon revenue. As further discussed in Section 14.13, this is corroborated by Google’s own revenue sharing model with developers who list applications on the Google Play Store. Google’s model is to share a certain amount of revenue with the developers, before considering its costs. However, as a conservative measure, I have also provided alternative calculations which determine the quantitative indicator for the ’033 Patent based upon Google’s gross margin realized from advertising and subscriptions.

12.2.1 Direct Control Quantitative Indicator Based on Incremental Revenue

In certain circumstances, Google prioritizes increased time spent on Google platforms to view advertisements and interact with other Google subscriptions or services over the profitability of its hardware sales. Given this business model, rather than attempt to apportion Pixel devices, which include countless other technologies in addition to what is claimed in the ’033 Patent, I have instead considered the incremental YouTube advertising revenue and subscription revenue that Google generates based on increased time users

⁴³⁸ GOOG-SONOSNDCA-00071716-725 at 722.

⁴³⁹ Deposition of Christopher Chan, November 29, 2022, p. 93.

⁴⁴⁰ GOOG-SONOSNDCA-00071716-725 at 722.



12.2.3 Direct Control Quantitative Indicator Conclusion

Based upon the reasonable royalty indicators calculated above, I believe the appropriate starting point for the *Georgia-Pacific* analysis is \$1.39, based upon the incremental YouTube advertising and subscription revenue royalty quantitative indicator.⁴⁸⁰

12.2.4 Zone Scene Reasonable Royalty Indicator

As described above, Google does not earn substantial income on the sales of the '885 Accused Instrumentalities themselves, but instead relies on the functionality to increase the number of users and amount of time those users are interacting with the Google ecosystem in an effort to generate additional advertising revenue. Therefore, I have considered an approach under which Sonos, as the technology developer, would charge Google a fee to implement this technology into its products.

I have investigated the offerings of a third-party company, If This Then That ("IFTTT") which provides similar, albeit less valuable, functionality as Sonos's patented Zone Scene technology.

12.2.4.1 IFTTT Background

IFTTT is a web-based service that allows its users to create sequential chains of simple conditional statements, comprised of "if" statements ("triggers"), which check for a condition, and "then" statements ("actions"), which act upon a service based upon the returned value of the trigger.⁴⁸¹ For example, IFTTT offers pre-made applets that allow a consumer to integrate across applications, devices, and services to perform functions such as: determining the temperature of your home using the current weather conditions, activating a security system upon leaving home, and voice-activation of a device.⁴⁸²

I understand that Dr. Almeroth has reviewed IFTTT and provided input regarding its technical comparability to the claimed technology in the '885 Patent:

I have been asked to review the "Applets" provided by "IFTTT" to determine whether they are technologically comparable to the claimed technology of the '885 and '966 Patents. According to the IFTTT website, "IFTTT is short for If This Then That, and is the best way to integrate apps, devices, and services." To provide such integration, IFTTT offers "Applets" that have "a combination of triggers and actions that can be combined to create the automations that help you achieve your goals, be more efficient, and improve your smart home." For example, a first IFTTT Applet can be programmed and saved with routines or actions, which are executed with the press of a first button, to play music on multiple smart speakers in a home. Similarly, a second Applet can be programmed and saved with routines or actions, which are executed with the press of a second button, to play music on at least one of the speakers in the first Applet together with at least one different speaker (not included in the first Applet) in the same home.

⁴⁸⁰ \$1.39 = \$1.12 royalty rate for advertising revenue + \$0.27 royalty rate for subscription revenue. See Appendices 5.1.1.1 and 5.1.2.1-S.

⁴⁸¹ "IFTTT – Trust, Ownership, Control and Business Model," *Mere Civilian*, <https://www.merecivilian.com/ifttt/#:~:text=IFTTT%20has%20stated%20that%20there%20are%20over%20200%2C000,expensive%20tiers%20and%20any%20revenue%20from%20IFTTT%20partners.>

⁴⁸² "WTF is IFTTT?" *IFTTT*, https://ifttt.com/explore/new_to_ifttt.



IFTTT's operational and functional capabilities, including building, creating, saving, and invoking different groups of speakers.⁴⁹¹

Given these abilities, I find that, contrary to Dr. Schonfeld's claim that "the technology contained within IFTTT is totally unrelated to the technology of the '885 Patent," the IFTTT service allows a user to create, name, and save a speaker group for later recall, providing comparable functionality to the Asserted Claims of the '885 Patent.⁴⁹² Dr. Schonfeld also argues that IFTTT is "does not appear targeted at facilitating or suggesting grouping of speakers...because the whole point of IFTTT is to allow a user to access a huge number of apps and create a near-infinite number of applets that automate tasks for users."⁴⁹³ I do not disagree with Dr. Schonfeld that IFTTT offers immense capabilities outside of the ability to group speakers, such as "creating notifications based on the Weather Underground app, [...] which has nothing in common with the alleged invention."⁴⁹⁴ However, my analysis of the IFTTT service is merely the first step in my analysis in calculating a quantitative indicator for the Zone Scene technology; it does, despite Dr. Schonfeld's opinion, allow for a user to create similar, albeit less valuable, speaker groups similar to those contemplated in the Zone Scene Patents. As such, IFTTT's ability to charge for the ability to create this service provides an initial indicator to the value of the Zone Scene Patents.

12.2.4.2 IFTTT Pricing History

From its inception through September 2020, IFTTT offered services to its users for free, with no limitations in terms of speed, applet count, or access. In September 2020, IFTTT rolled out two subscription plans: "Standard" and "Pro."⁴⁹⁵ At that time, the "Standard" plan would allow users to turn on unlimited applets and to create up to three applets, but did not allow "multi-step applets."⁴⁹⁶ The "Standard" subscription had no monthly fee.⁴⁹⁷ At the same time, the "Pro" plan provided users with unlimited applet creation, multi-step applets with queries, conditional logic statements, and multiple actions (*i.e.*, "if-then-then" statements), exclusive customer support, and faster execution.⁴⁹⁸ Initially, IFTTT's initial pricing model for the "Pro" subscription gave users the ability to set their price as one of four options: \$3.99, \$5.99, \$9.99, and custom.⁴⁹⁹ The custom field allowed users to input the price they wanted to pay, as long as it was at least \$1.99 per month.⁵⁰⁰ The creator of IFTTT thought the true value of the technology was \$9.99 per month, and it was

⁴⁹¹ Opening Almeroth Report, pp. 386-395.

⁴⁹² Rebuttal Expert Report of Dan Schonfeld, Ph.D., July 27, 2022, p. 37.

⁴⁹³ Rebuttal Expert Report of Dan Schonfeld, Ph.D., July 27, 2022, pp. 38, 45.

⁴⁹⁴ Rebuttal Expert Report of Dan Schonfeld, Ph.D., July 27, 2022, pp. 38, 45.

⁴⁹⁵ "How much does IFTTT Cost?" *Automate Your Life*, <https://automatelife.net/how-much-does-ifttt-cost/>.

⁴⁹⁶ "How much does IFTTT Cost?" *Automate Your Life*, <https://automatelife.net/how-much-does-ifttt-cost/>.

⁴⁹⁷ "How much does IFTTT Cost?" *Automate Your Life*, <https://automatelife.net/how-much-does-ifttt-cost/>.

⁴⁹⁸ "How much does IFTTT Cost?" *Automate Your Life*, <https://automatelife.net/how-much-does-ifttt-cost/>.

⁴⁹⁹ Hearn, P., "IFTTT Pricing: Is Pro Worth The Cost?" *Online Tech Tips*, <https://www.online-tech-tips.com/software-reviews/ifttt-pricing-is-pro-worth-the-cost/>; Varughese, A., "How much does IFTTT Cost?" *Automate Your Life*, <https://automatelife.net/how-much-does-ifttt-cost/>.

⁵⁰⁰ Hearn, P., "IFTTT Pricing: Is Pro Worth The Cost?" *Online Tech Tips*, <https://www.online-tech-tips.com/software-reviews/ifttt-pricing-is-pro-worth-the-cost/>; Varughese, A., "How much does IFTTT Cost?" *Automate Your Life*, <https://automatelife.net/how-much-does-ifttt-cost/>.



expected that eventually the lower subscription fees would be phased out.⁵⁰¹ This “Set your price” payment model only lasted from September 2020 through the end of October 2020.⁵⁰²

Figure 34: IFTTT “Pro” Subscription Pricing – September 2020⁵⁰³

2. Payment options

Set your price /month

☐ **\$3.99**
☐ **\$5.99**
☒ **\$9.99**

(\$1.99 USD or more)

For a limited time, you may set your price for IFTTT Pro and we will honor it indefinitely. All subscriptions are in US\$ and renew monthly.

As of November 2020, IFTTT still offered the same “Standard” and “Pro” plans, but the pricing for the “Pro” subscription had changed.⁵⁰⁴ Rather than allow users to set the price, the “Pro” subscription was only offered at \$3.99 per month.⁵⁰⁵

In November 2021, IFTTT began offering three subscription plans: “Free”, “Pro”, and “Pro+.”⁵⁰⁶ As of November 2022, IFTTT still offers the same three plans, but at lower price points.⁵⁰⁷ The “Free” plan allows users to create up to five applets, run at standard applet speeds, make and use published applets, unlimited applet runs, free mobile access, and simple no-code integrations.⁵⁰⁸ Like the “Standard” plan, the “Free” plan does not allow users to create “multi-action applets.” The “Pro” plan, priced at \$2.50 per month, allows users to create up to twenty applets, run at increased applet speeds, create multi-action applets, and have access to customer support.⁵⁰⁹ The “Pro+” plan, priced at \$5.00 per month, allows users to create unlimited applets, have access to every “Pro” subscription feature, connect multiple accounts, use queries and filter code, access developer tools, and have access to priority customer support.⁵¹⁰

⁵⁰¹ Hearn, P., “IFTTT Pricing: Is Pro Worth The Cost?” *Online Tech Tips*, <https://www.online-tech-tips.com/software-reviews/ifttt-pricing-is-pro-worth-the-cost/>.

⁵⁰² Hearn, P., “IFTTT Pricing: Is Pro Worth The Cost?” *Online Tech Tips*, <https://www.online-tech-tips.com/software-reviews/ifttt-pricing-is-pro-worth-the-cost/>; “Find the right plan,” *IFTTT*, <https://web.archive.org/web/20201103212957/https://ifttt.com/plans>.

⁵⁰³ Hearn, P., “IFTTT Pricing: Is Pro Worth The Cost?” *Online Tech Tips*, <https://www.online-tech-tips.com/software-reviews/ifttt-pricing-is-pro-worth-the-cost/>.

⁵⁰⁴ “Find the right plan,” *IFTTT*, <https://web.archive.org/web/20201103212957/https://ifttt.com/plans>.

⁵⁰⁵ “Find the right plan,” *IFTTT*, <https://web.archive.org/web/20201103212957/https://ifttt.com/plans>.

⁵⁰⁶ “Find the plan for you,” *IFTTT*, <https://web.archive.org/web/20211111223804/https://ifttt.com/plans>.

⁵⁰⁷ “Find the plan for you,” *IFTTT.com*, <https://ifttt.com/plans>.

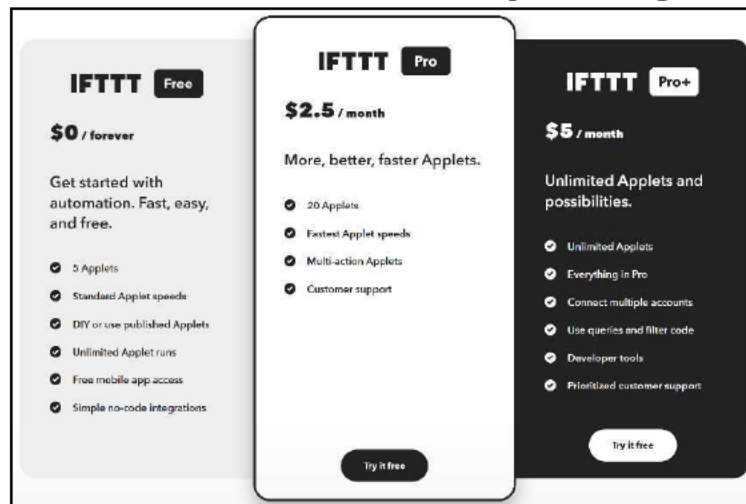
⁵⁰⁸ “Find the plan for you,” *IFTTT.com*, <https://ifttt.com/plans>.

⁵⁰⁹ “Find the plan for you,” *IFTTT.com*, <https://ifttt.com/plans>.

⁵¹⁰ “Find the plan for you,” *IFTTT.com*, <https://ifttt.com/plans>.



Figure 35: IFTTT “Free,” “Pro,” and “Pro+” Subscription Pricing – November 2022⁵¹¹



12.2.4.3 Zone Scene Reasonable Royalty Quantitative Indicator

IFTTT’s ability to provide similar functionality to the zone scene technology relies on the creation of two multi-action applets. I understand that IFTTT is both easy to use and requires no technical expertise.⁵¹² To help with building an applet, IFTTT offers pre-made triggers and actions. For example, IFTTT offers a trigger called “Button press,” actions for Sonos devices including “Resume” playback and a “Start playback” action for Spotify.⁵¹³

Using these pre-defined offerings, IFTTT users can build an applet to resemble the functionality of the zone scene technology in at least two different methods using the “Button press” trigger:

- 1) Choosing an action for resuming/playing music on a first Sonos speaker, and choosing an action for resuming/playing music on a second Sonos speaker;⁵¹⁴ or
- 2) Choosing an action for starting playback of Spotify music on a first speaker, such as a Google or Amazon speaker, and choosing an action for resuming/playing music on a second speaker, such as a Sonos speaker.⁵¹⁵

I understand that an IFTTT user may create multiple applets using one or more overlapping speakers between each applet. Specifically, a user may create one applet utilizing a first speaker and a second speaker, and also create a second applet which utilizes a first speaker and a third speaker, with each speaker in a group set up to play back the same song as the others in that group. The IFTTT user is also allowed to name and

⁵¹¹ “Find the plan for you,” *IFTTT.com*, <https://ifttt.com/plans>.

⁵¹² SONOS-SVG2-00224846-850 at 846, 848; SONOS-SVG2-00227578-583 at 580; SONOS-SVG2-00227600-604 at 600, 602.

⁵¹³ SONOS-SVG2-00224846-850 at 848; SONOS-SVG2-00227605-606; SONOS-SVG2-00227613-614.

⁵¹⁴ SONOS-SVG2-00227566.

⁵¹⁵ SONOS-SVG2-00227570.



save each applet.⁵¹⁶ To activate the IFTTT applets, the user simply activates the “Button press” trigger (which can be saved, for example, as a widget on an iPhone home screen), which then implements one of the three methods listed above, causing a group of speakers to play a song. In other words, *if* the “Button press” trigger is activated, *then* the relevant Sonos or Spotify actions are executed, resulting in a group of speakers playing a song.⁵¹⁷

As such, IFTTT provides for a portion of the zone scene functionality contemplated by the Asserted Claims of the ’885 Patent and ’966 Patent. Specifically, the actions described above allow an IFTTT user to program, name, save, and then activate a first group of speakers for music playback, as well as program, name, save, and activate a second group of speakers for music playback, where there is at least one overlapping speaker between the first speaker group and second speaker group. The speakers in each group can also be set up to play the same song. However, I understand IFTTT is unable to enable the entire functionality contemplated in the Asserted Claims of the ’885 Patent and ’966 Patent. For example, music that is played through a speaker group via an IFTTT applet is not synced.

The “Pro” subscription is the cheapest plan that allows users to create two multi-action applets, thereby replicating the functionality of zone scene technology. Given that, I have assumed that the “Pro” subscription fee would be an appropriate starting point for determining what Sonos would charge Google as a per-device royalty for each of the Zone Scene Patents.

Around the time of the hypothetical negotiation for the ’885 Patent, in November 2020, the “Pro” subscription cost \$3.99 per month, or \$11.97 per quarter. In September 2020, a few months before the hypothetical negotiation, users were given the option of selecting their own subscription fee, as long as it was at least \$1.99 per month. I understand this was the first instance in which IFTTT users were asked to pay for the services provided by IFTTT applets.⁵¹⁸ In order to be conservative, I have provided a range of “Pro” subscription fees as a starting point including the lowest fee IFTTT offered of \$1.99 per month (\$5.97 per quarter) as a low price and the next lowest offered price, which was \$3.99 per month (\$11.97 per quarter), as a high price.

Around the time of the hypothetical negotiation for the ’966 Patent, in November 2019, the “Pro” subscription was provided at no cost to IFTTT users. As stated above, IFTTT users were first asked to pay for IFTTT services for the first time in September 2020, with the option to subscribe to the “Pro” plan for as little as \$1.99 per month. I believe that the parties would understand that IFTTT would not be able to offer its services for free indefinitely, and the initial prices offered would be known or knowable at the time of the hypothetical negotiation for the ’966 Patent. In order to be conservative, I use \$1.99 per month, the lowest IFTTT “Pro” plan price offered as a starting point to my reasonable royalty analysis for the ’966 Patent; this results in \$5.97 per quarter.

⁵¹⁶ SONOS-SVG2-00227592; SONOS-SVG2-00227584-585.

⁵¹⁷ Opening Almeroth Report, pp. 386-395.

⁵¹⁸ “IFTTT.com Plans,” *Wayback Machine*, <https://web.archive.org/web/20200930053720/https://ifttt.com/plans>; Hearn, P., “IFTTT Pricing: Is Pro Worth The Cost?” *Online Tech Tips*, <https://www.online-tech-tips.com/software-reviews/ifttt-pricing-is-pro-worth-the-cost/>.



I understand that IFTTT's "Pro" subscription currently gives a user the ability to create 20 applets, however, the functionality that replicates zone scene technology can be accomplished on just two applets. Therefore, I apportion IFTTT's "Pro" subscription fees by a factor of 2/20 (10%) to get a low per-device subscription fee of \$0.60 per quarter and a high per-device subscription fee of \$1.20 per quarter for the '885 Patent.⁵¹⁹ For the '966 Patent, I apportion the IFTTT "Pro" subscription fee by the same factor (2/20).

Figure 36: Quarterly IFTTT Subscription Fees for Comparable Zone Scene Technology⁵²⁰

	<u>Low</u>	<u>High</u>
IFTTT "Pro" Price Subscription	\$ 5.97	\$ 11.97
Apportionment Metric	<u>10.0%</u>	<u>10.0%</u>
Quarterly Subscription Fee for Comparable Zone Scene Functionality	<u>\$ 0.60</u>	<u>\$ 1.20</u>

IFTTT subscriptions would continue indefinitely as long as the user stays subscribed to the service. However, I have only considered the lifetime value of one smartphone as the total time that the zone scene subscription fee would be applicable. The average lifetime value of a smartphone (*i.e.*, a Google Pixel phone) is two and a half years or ten quarters.⁵²¹ Therefore, I applied the quarterly subscription fee for zone scene to the lifetime value of a smartphone, ten quarters, and then discounted those fees by Google's weighted average cost of capital ("WACC") at the time of the hypothetical negotiation, of 7.4% and 8.8% for the '885 Patent and '966 Patent, respectively, to calculate the NPV of the lifetime value of zone scene technology per device.⁵²² Using the low quarterly subscription fee, the NPV of lifetime value of zone scene technology per device is \$4.27 for the '885 Patent and \$4.04 for the '966 Patent.⁵²³ Using the high quarterly subscription fee, the NPV of lifetime value of zone scene technology per device is \$8.56 and \$8.09.⁵²⁴

⁵¹⁹ Appendices 4.4 and 4.3.

⁵²⁰ Appendix 4.3.

⁵²¹ Jesper, "What is the average lifespan of a smartphone?" *CoolBlue.nl*, <https://www.coolblue.nl/en/advice/lifespan-smartphone.html>; Chng, R., "How Long Can A Smartphone Last? (With 6 Real Examples)," *Valorvortech.com*, <https://valorvortech.com/how-long-can-a-smartphone-last/>; "Average lifespan (replacement cycle length) of smartphones in the United States from 2014 to 2025," *Statista.com*, <https://www.statista.com/statistics/619788/average-smartphone-life/>.

⁵²² Google's weighted average cost of capital as of Q4 2020 and Q4 2019 was 7.4% and 8.8%. *Bloomberg Terminal*, accessed November 18, 2022. Appendices 4.1.4 and 4.2.4.

⁵²³ Appendices 4.1.4 and 4.2.4.

⁵²⁴ Appendices 4.1.4 and 4.2.4.

**Figure 37: NPV of Lifetime Value of '885 Patent Per Device**⁵²⁵

Low	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023
Quarterly Subscription Fee for '885 Patent - Low	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60
Partial Period Factor	0.101	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.899
Mid-Period Factor	0.051	0.551	1.601	2.601	3.601	4.601	5.601	6.601	7.601	8.601	9.551
Present Value Factor	0.996	0.961	0.892	0.831	0.773	0.720	0.670	0.624	0.581	0.541	0.506
Present Value	\$ 0.06	\$ 0.57	\$ 0.53	\$ 0.50	\$ 0.46	\$ 0.43	\$ 0.40	\$ 0.37	\$ 0.35	\$ 0.32	\$ 0.27
NPV of Lifetime Value of '885 Patent Per Device - Low											
	\$ 4.27										
High	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023
Quarterly Subscription Fee for '885 Patent - High	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20
Partial Period Factor	0.101	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.899
Mid-Period Factor	0.051	0.551	1.601	2.601	3.601	4.601	5.601	6.601	7.601	8.601	9.551
Present Value Factor	0.996	0.961	0.892	0.831	0.773	0.720	0.670	0.624	0.581	0.541	0.506
Present Value	\$ 0.12	\$ 1.15	\$ 1.07	\$ 0.99	\$ 0.93	\$ 0.86	\$ 0.80	\$ 0.75	\$ 0.70	\$ 0.65	\$ 0.54
NPV of Lifetime Value of '885 Patent Per Device - High											
	\$ 8.56										
NPV Inputs											
NPV Date	24-Nov-20										
Year End	31-Dec-20										
Partial Period	0.101										
Discount Rate	7.4%										

Figure 38: NPV of Lifetime Value of '966 Patent Per Device⁵²⁶

Low	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022
Quarterly Subscription Fee for '966 Patent - Low	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60	\$ 0.60
Partial Period Factor	0.153	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.840
Mid-Period Factor	0.077	0.577	1.653	2.653	3.653	4.653	5.653	6.653	7.653	8.653	9.577
Present Value Factor	0.994	0.953	0.870	0.799	0.735	0.675	0.621	0.571	0.524	0.482	0.446
Present Value	\$ 0.09	\$ 0.57	\$ 0.52	\$ 0.48	\$ 0.44	\$ 0.40	\$ 0.37	\$ 0.34	\$ 0.31	\$ 0.29	\$ 0.23
NPV of Lifetime Value of '966 Patent Per Device -											
	\$ 4.04										
High	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022
Quarterly Subscription Fee for '966 Patent - High	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20	\$ 1.20
Partial Period Factor	0.153	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.847
Mid-Period Factor	0.077	0.577	1.653	2.653	3.653	4.653	5.653	6.653	7.653	8.653	9.577
Present Value Factor	0.994	0.953	0.870	0.799	0.735	0.675	0.621	0.571	0.524	0.482	0.446
Present Value	\$ 0.18	\$ 1.14	\$ 1.04	\$ 0.96	\$ 0.88	\$ 0.81	\$ 0.74	\$ 0.68	\$ 0.63	\$ 0.58	\$ 0.45
'966 Patent Per Device - High											
	\$ 8.09										
NPV Inputs											
NPV Date	5-Nov-19										
Year End	31-Dec-19										
Partial Period	0.153										
Discount Rate	8.8%										

As discussed above, I understand that while asserted claim 1 of the '885 Patent is directed to and infringed by a single "zone player" with certain functional capability, the claim recites three separate "zone players" (*e.g.*, speakers), two separate groups or zone scenes, and one common or overlapping "zone player" at a

⁵²⁵ Appendix 4.1.4.⁵²⁶ Appendix 4.2.4.



minimum.⁵²⁷ Of the people who own a smart speaker in the U.S., 29% have three or more smart speakers.⁵²⁸ Applying a 29% apportionment to the NPV of the lifetime value of zone scene technology per device leads to low and high zone scene quantitative indicators of \$1.24 and \$2.48 for the '885 Patent and \$1.17 and \$2.35 for the '966 Patent, respectively.⁵²⁹

Figure 39: Per-Device Zone Scene Quantitative Indicators for the '885 Patent⁵³⁰

Metric	Low	High
NPV of Lifetime Value of '885 Patent Per Device	\$ 4.27	\$ 8.56
Apportionment Metric - Share of Households with Zone Scene Capability	29.0%	29.0%
'885 Patent Quantitative Indicator	\$ 1.24	\$ 2.48

Figure 40: Per-Device Zone Scene Quantitative Indicators for the '966 Patent⁵³¹

Metric	Low	High
NPV of Lifetime Value of '966 Patent Per Device	\$ 4.04	\$ 8.09
Apportionment Metric - Share of Households with Zone Scene Capability	29.0%	29.0%
'966 Patent Quantitative Indicator	\$ 1.17	\$ 2.35

12.3 Cost Approach

As described in Economic Damages in Intellectual Property:

*The cost approach values assets based on the cost to create and develop the assets. The premise behind the cost approach is that no party involved in an arm's-length transaction would be willing to pay more to use the property than the cost to replace the property. In the context of patents, for instance, a potential licensee would not pay more to license a patent than the cost to design around the technology contributed by the patent. An alternative to designing around the technology would be to purchase the technology. Accordingly, a potential licensee would not pay more to license the technology than it would have to pay to purchase or create the technology.*⁵³²

⁵²⁷ Opening Almeroth Report, pp. 27-28.

⁵²⁸ "The Smart Audio Report – Spring 2020," NPR, slide 9, https://www.nationalpublicmedia.com/uploads/2020/04/The-Smart-Audio-Report_Spring-2020.pdf.

⁵²⁹ Appendices 4.1.3 and 4.2.3.

⁵³⁰ Appendix 4.1.3.

⁵³¹ Appendix 4.2.3.

⁵³² Slottje, D., "Economic Damages in Intellectual Property," pp. 291-293.



enabled media players) compete against Sonos's media players in the WMRS market.⁵⁴⁸ I have not relied on any market share lost by Sonos to Google in my analyses.

Finally, my damages calculations are conservative because I have not included all of Google's direct infringement in my analyses. For instance, I have not included the infringing products that Google imports into the United States but does not sell in the United States (*e.g.*, they are sold in Canada and Mexico).⁵⁴⁹ Although Google has yet to produce the financial information for such imports, there are presumably thousands of such products, if not millions. I have also not included any of the infringing products that Google does not sell but uses internally for its employees and testing. Google had over 185,000 employees worldwide as of September 30, 2022 with 48% of its revenue coming from the U.S. in the same quarter.⁵⁵⁰ Consequently, Google receives a significant benefit from using these infringing products.

14. *GEORGIA-PACIFIC* FACTOR ANALYSIS

The hypothetical negotiation is to be evaluated in the context of the specific business facts and circumstances faced at that time by the patentee and the prospective licensee. *Georgia-Pacific Corp. v. United States Plywood Corp.* provides a 15-factor framework to perform such an analysis.⁵⁵¹ For each of the 15 *Georgia-Pacific* factors, I have identified the relevant information and facts that may have influenced the royalty rate in the hypothetical negotiation. I note that to some extent, certain of the *Georgia-Pacific* factors have already been addressed in connection with my analysis above.

14.1 **Factor #1: The royalties received by the patentee for the licensing of the patent-in-suit, proving or tending to prove an established royalty.**

Factor #1 represents a quantitative valuation metric associated with the determination of a reasonable royalty. Analysis of this factor is sometimes referred to as the Market Approach in the context of intellectual property valuation, which I have addressed above in Section 12.1. As discussed above, the Market Approach attempts to measure the value of an intangible asset by drawing inferences from actual market transactions involving that asset or similar assets. In general, the more similar those market transactions are to the transaction in question (*i.e.*, the hypothetical negotiation), the more useful the information. While exactly matching transactions cannot always be found, they do exist in some situations. In the absence of an exactly matching transaction, market transactions that share some characteristics with the subject transaction can provide guidance as to the terms and conditions that may be applicable in a particular case.

I have considered the agreements produced by Sonos in this case, as discussed in the Market Approach. Notably, Sonos's licenses include grants to Sonos's entire patent portfolio relating to wireless multi-room audio. The royalty rates included in these portfolio-wide licenses are greater than the quantitative indicators I have calculated related to Direct Control and Zone Scene because of the other technologies Sonos owns.

⁵⁴⁸ SONOS-SVG2-00055658; SONOS-SVG2-00055659.

⁵⁴⁹ Deposition of Michael Maigret, May 13, 2022, pp. 51-54.

⁵⁵⁰ Alphabet Form 10-Q for the period ending September 30, 2022, pp. 37, 40.

⁵⁵¹ *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).



The portfolio-wide licenses, which would include a license to the Asserted Patents, would therefore represent a royalty rate ceiling which Sonos and Google would determine is appropriate at the hypothetical negotiation.

In my opinion, there is no comparable license agreement with a grant as narrow as the hypothetical negotiation. Therefore, the Sonos licenses do not inform the royalty rate beyond acting as a ceiling to the hypothetical negotiation. However, the structure of Sonos's past licenses indicate that Sonos prefers running royalties on unit sales over a lump sum payment.⁵⁵² Regardless, my analysis is agnostic to the structure of the running royalty, and I do not believe that the choice of either royalty structure would affect the outcome of the hypothetical negotiation.

Impact on Hypothetical Negotiations: Considered in Quantitative Analysis

14.2 Factor #2: The rates paid by the licensee for the use of other patents comparable to the patent-in-suit.

Factor #2 also relates to the Market Approach and considers licenses entered into by the licensee which may provide relevant insight into the hypothetical negotiation. I have considered the agreements which have been produced by Google in this case in the Market Approach. Each of the agreements produced by Google are not economically comparable to the hypothetical negotiation in this case.

Unlike the hypothetical license, three of the licenses were licensed by a subsidiary of Allied Security Trust, a "member-driven cooperative... focused on helping global companies analyze patent purchase opportunities and complete defensive patent acquisitions in a fully transparent, efficient, and cost-effective way."⁵⁵³ In other words, a non-profit, non-operating company was on the other side of the negotiating table, instead of an operating competitor such as Sonos.

Next, none of these licenses contain any explicit consideration in exchange for the licenses provided. Rather, each license contains the following language: "Licensor acknowledges that its acquisition of the Licensed Patents was funded in part by [Google], and that such partial funding shall be deemed to include a non-refundable license fee that Licensor has accepted as Full consideration for the license granted to Licensee hereunder."⁵⁵⁴ Google has produced the corresponding invoices and bid letters for these respective licenses, reflecting total payments of \$10,000 to \$80,000.⁵⁵⁵ As such, I find that none of these agreements are probative in determining the "rates paid by the licensee."

Google also provided six patent purchase agreements, two of which occurred through its subscription to the Invention Investment Fund I, L.P. Due to the nature of purchasing patents, Google's effective term would be the remaining life of the patents (or as long as it paid maintenance fees). Given the nature of these patent purchasing agreements, and the fact that they are all with NPEs, I find that none of Google's produced purchase agreements are indicative of the royalty rate which would be agreed upon by Sonos and Google at

⁵⁵² SONOS-SVG2-00042905-922 at 910; SONOS-SVG2-00042923-944 at 927-928.

⁵⁵³ Allied Security Trust, "Our Mission," *Allied Security Trust*, <https://www.ast.com/about-us/asts-mission/>.

⁵⁵⁴ Section 12.1.2.

⁵⁵⁵ GOOG-SONOSNDCA-00069849-851; GOOG-SONOSNDCA-00069847-848; GOOG-SONOSNDCA-00069846; GOOG-SONOSNDCA-00069845.



the hypothetical negotiation. In contrast to Sonos, the structure of Google's historical agreements indicate that Google prefers lump-sum payments over running royalty structures.⁵⁵⁶ Regardless, my analysis is agnostic to the structure of the running royalty, and I do not believe that the choice of either royalty structure would affect the outcome of the hypothetical negotiation.

Therefore, the impact of this factor is reflected in my quantitative analysis described above in Section 12.1.

Impact on Hypothetical Negotiation: Considered in Quantitative Analysis

14.3 Factor #3: The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold.

I have considered the hypothetical negotiation would have resulted in a non-exclusive license that would: 1) have been unrestricted as to customers or territory; 2) cover products covered by the asserted claims made, used, sold, or offered for sale in the U.S.; and 3) cover sales made outside of the U.S. only to the extent such sales touch the U.S. and/or are otherwise implicated by U.S. patent laws. Although it would have been a relevant consideration to the hypothetical negotiation, I do not believe it would have placed either party in a relatively stronger bargaining position.

Additionally, I have already considered, in my analysis of the Market Approach, the extent to which the relevant license agreements encompass a broader scope than a non-exclusive, unrestricted bare patent license to the Asserted Patents.

Therefore, I find that this consideration would tend to have a neutral influence in this hypothetical negotiation.

Impact on Hypothetical Negotiation: Neutral

14.4 Factor #4: The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly.

I am unaware of any official licensing policy document created by Sonos to "maintain [its] patent monopoly." However, its past licensing actions demonstrate a desire to maintain and enforce its patent monopoly. Specifically, Sonos litigated against Lenbrook and Denon and subsequently ended up granting each a nonexclusive license subject to specific royalty payments.⁵⁵⁷ In addition, Sonos has sent Google its IP Licensing Model with the goal to "obtain a royalty rate that reflects the value attributable to the features of Google's products that are covered by the Sonos patent portfolio."⁵⁵⁸ Sonos's activism in identifying infringing use in the market demonstrates that Sonos wishes to keep its patent monopoly.

⁵⁵⁶ Sections 12.1.2-12.1.4.

⁵⁵⁷ Section 12.1.1.

⁵⁵⁸ SONOS-SVG2-00041807-860 at 807, 809.



Therefore, I find that this consideration would tend to favor the licensor in this hypothetical negotiation.

Impact on Hypothetical Negotiation: Licensor

14.5 Factor #5: The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter.

Licenses to competitors generally contain a higher royalty rate to compensate for the risk of potential lost sales and/or market share; whereas licenses to entities with an inventor/promoter relationship generally contain lower royalty rates to account for the promoter being able to distribute the product to customers that the inventor would not typically be able to reach.

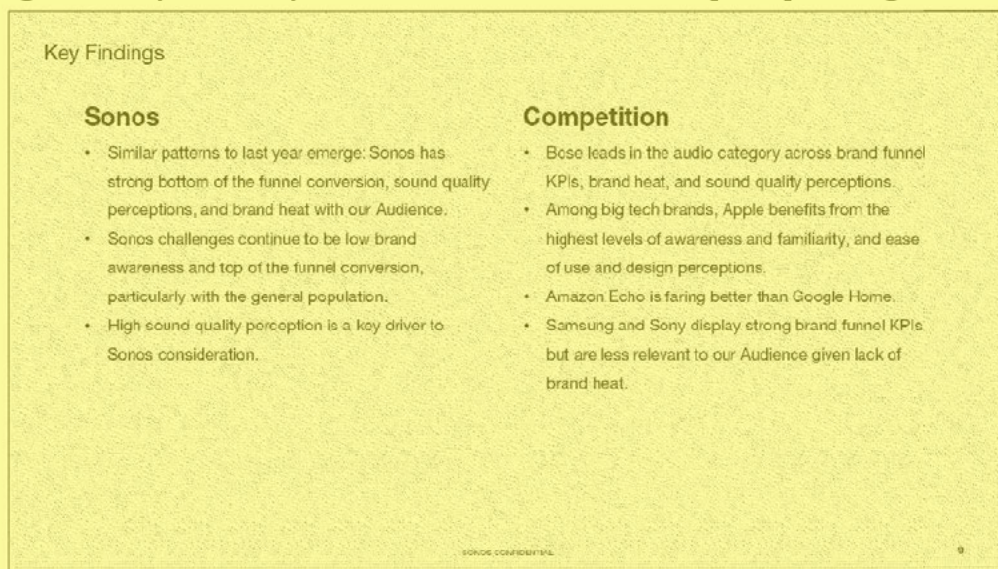
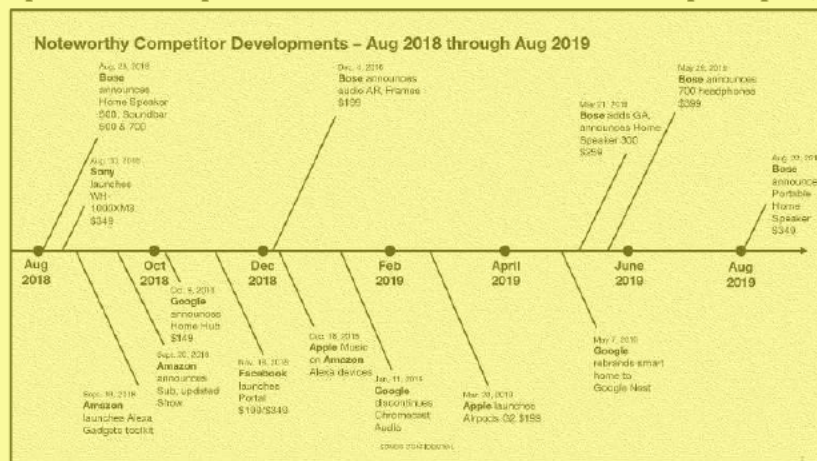
Google's first WMRS product, the Chromecast Audio, was released in 2015. While this product did not yet include multi-room audio streaming, Google was working to implement the feature in the future:

*Google's recently-launched Chromecast Audio adapter is getting a major feature update this week: Consumers will now be able to group multiple Chromecast audio adapters to stream their favorite music simultaneously in more than one room, similar to the multi-room support available for internet-connected loudspeakers like the ones made by Sonos.*⁵⁵⁹

After the release of the Chromecast Audio, Google released the Google Home which was an "all-in-one" audio player making it more akin to Sonos's prior Play:1, Play:3, and Play:5 products. With respect to these products, Google is competing with Sonos. Internal Sonos documents demonstrate that Sonos identifies larger technology players, like Apple and Google, as competitors in addition to more traditional speaker manufacturers, such as Bose.⁵⁶⁰

⁵⁵⁹ Roettgers, J., "Google's Chromecast Audio Adapter Gets Multi-Room Support Similar to Sonos," *Variety.com*, <https://variety.com/2015/digital/news/chromecast-audio-multiroom-grouping-1201657931/>.

⁵⁶⁰ SONOS-SVG2-00053537-574 at 545.

**Figure 41: Key Takeaways from Sonos Annual Brand Tempo Report, August 2019**⁵⁶¹**Figure 42: Competitor Developments from Sonos Annual Brand Tempo Report, August 2019**⁵⁶²

From Google's perspective, internal business documentation also repeatedly designates Sonos as a competitor in the home audio or smart speaker market. Internal Google presentations, as evidenced by the figure below, indicate that Google and Sonos compete at multiple price levels of the market – at the entry level with the Google Home and Sonos Play:1, as well as at the premium tier with Google Home Max and the Sonos Play:5.⁵⁶³

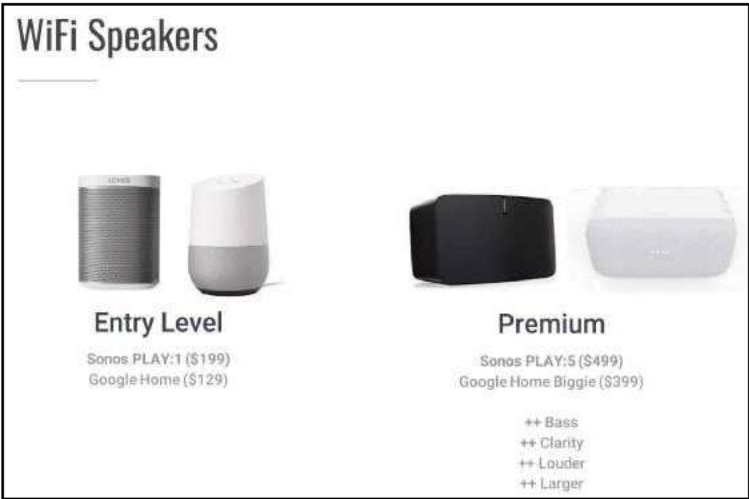
Figure 43: Google and Sonos WiFi Speaker Competition⁵⁶⁴

⁵⁶¹ SONOS-SVG2-00053537-574 at 545.

⁵⁶² SONOS-SVG2-00053537-574 at 543.

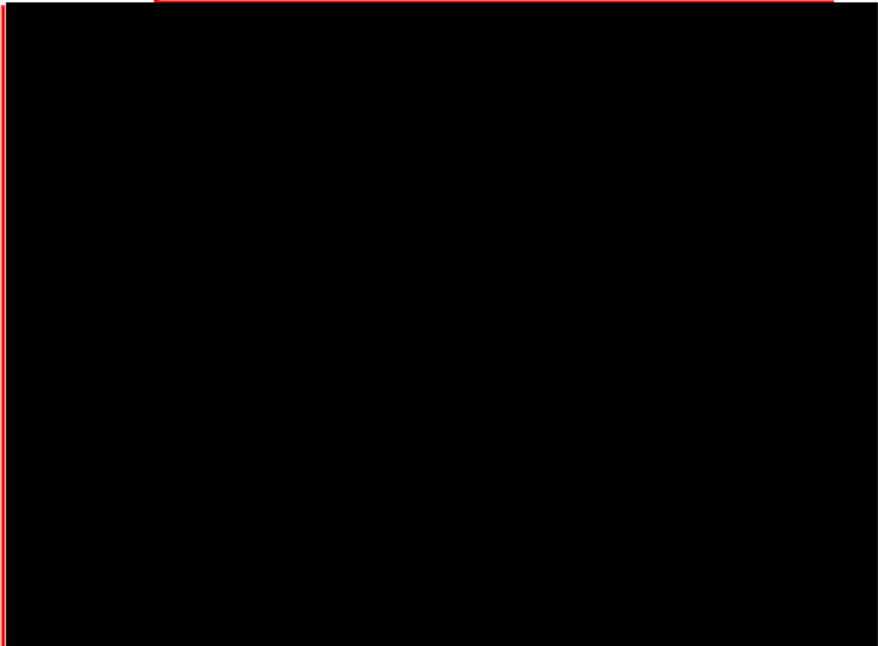
⁵⁶³ GOOG-SONOSNDCA-00056500-572 at 502.

⁵⁶⁴ GOOG-SONOSNDCA-00056500-572 at 502.



In addition to [REDACTED] 565

Figure 44: [REDACTED] 566



565 GOOG-SONOSNDCA-00056242-243 at 242.

566 GOOG-SONOSNDCA-00056242-243 at 242.



Another workbook produced by Google indicates that [REDACTED]

The document shows [REDACTED]

⁵⁶⁷

Google even includes [REDACTED]

For

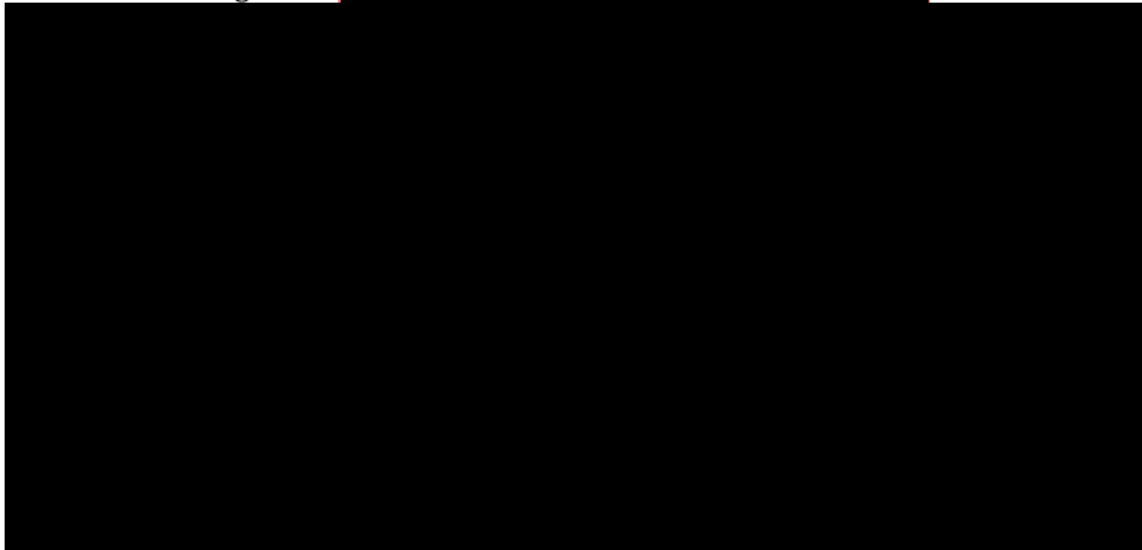
example, multiple 2019 presentations indicate that respondents were asked to [REDACTED]

⁵⁶⁸

Google also performed a conjoint survey analysis that included [REDACTED] and [REDACTED] as possible categories, as shown in the figure below.⁵⁶⁹

Figure 45:

⁵⁷⁰



The knowledge of [REDACTED]

as indicated in the questions below:

[REDACTED]

Various other internal Google documents I have reviewed demonstrate the competition between Sonos and Google.

⁵⁶⁷ GOOG-SONOSNDCA-00056658.

⁵⁶⁸ GOOG-SONOSNDCA-00056267-305 at 279; GOOG-SONOSNDCA00056306-347 at 316.

⁵⁶⁹ GOOG-SONOSNDCA-00056580-600 at 583.

⁵⁷⁰ GOOG-SONOSNDCA-00056580-600 at 583.

⁵⁷¹ GOOG-SONOSNDCA-00056235-241 at 236.

⁵⁷² GOOG-SONOSNDCA-00056348-369 at 356.



A June 2019 internal Google document [REDACTED]

In an internal Google document regarding [REDACTED]

Google produced a [REDACTED]

⁵⁷⁶ This demonstrates Google's desire to [REDACTED]

In an internal Google document, there is a [REDACTED]

⁵⁷⁷ In a Google Home review document, the press compared the Google Home to the Sonos Play:1 which "was superior in every way."⁵⁷⁸ Another internal document [REDACTED]

⁵⁷⁹

Figure 46:

80

⁵⁷³ GOOG-SONOSNDCA-00056244-266 at 252.

⁵⁷⁴ GOOG-SONOSNDCA-00056244-266 at 259.

⁵⁷⁵ GOOG-SONOSNDCA-00056267-305 at 279.

⁵⁷⁶ GOOG-SONOSNDCA-00056420-499.

⁵⁷⁷ GOOG-SONOSNDCA-00056658.

⁵⁷⁸ GOOG-SONOSNDCA-00058647-666 at 652-653.

⁵⁷⁹ GOOG-SONOSNDCA-00058814-867 at 818, 842, 846.

⁵⁸⁰ GOOG-SONOSNDCA-00058814-867 at 818.

⁵⁸¹ GOOG-SONOSNDCA-00073183-239 at 197-200.



I also note that Google's Christopher Chan testified to the competitive relationship between Google and Sonos within certain markets, pointing to certain reviews and conjoint studies he reviewed during the regular course of business.⁵⁸² Additionally, Mr. Chan noted that while he may not view the companies as "directly competitive," there is "some overlapping functionality" and that "in certain cases" there exists competition in the smart speaker market.⁵⁸³

In an email from October 2011, Google's Head of TV Technology, Vincent Dureau, [REDACTED]

⁸⁴ In May 2015, a Google employee asked other Google employees, [REDACTED]

In January 2016, [REDACTED]

⁵⁸⁷ An April 2016

email shows that a [REDACTED]

In a March 2016 email, [REDACTED]

Therefore, I find that this consideration would tend to favor the licensor in this hypothetical negotiation.

Impact on Hypothetical Negotiation: Favors Licensor

⁵⁸² Deposition of Christopher Chan, November 29, 2022, pp. 115-118.

⁵⁸³ Deposition of Christopher Chan, November 29, 2022, pp. 106-107, 117-118.

⁵⁸⁴ GOOG-SONOSNDCA-00073639; GOOG-SONOSNDCA-00073640-655 at 644.

⁵⁸⁵ GOOG-SONOSNDCA-00074185-187 at 185.

⁵⁸⁶ GOOG-SONOSNDCA-00074546-548 at 546.

⁵⁸⁷ GOOG-SONOSNDCA-00074740.

⁵⁸⁸ GOOG-SONOSNDCA-00074918-921 at 918.

⁵⁸⁹ GOOG-SONOSNDCA-00074794-796 at 794.

⁵⁹⁰ GOOG-SONOSNDCA-00074794-796 at 794.

⁵⁹¹ GOOG-SONOSNDCA-00074802-805 at 802.



14.6 Factor #6: The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to licensor as a generator of sales of his non-patented items; and the extent of such derivative or conveyed sales.

In addition to the incremental advertising and subscription revenue which Google generates once a user is included in its ecosystem, users are more likely to purchase additional hardware products from the same manufacturer. For instance, according to an article from 2018 in *The Verge*, Google is building an ecosystem in the smart home which “works better if you use more than one Google device.”⁵⁹² Instead of just purchasing one speaker, the goal is to encourage users to purchase additional Google hardware products to expand their selection with integrated devices.⁵⁹³ In this aspect, once a user joins the Google ecosystem by purchasing a smart speaker device, they are much more likely to purchase a second smart speaker also made by Google rather than another manufacturer, such as Sonos.

In addition, Sonos internal documents discuss the future loss associated with a user locked into a competitor’s ecosystem. Once a user or household purchases a Google hardware device, Google generates a great deal more revenue from that user or household. That initial lost sale to Sonos then becomes a loss of additional future sales because the user or household is locked into an ecosystem effect where like-manufacturer devices are preferred for integration. As an example, an October 2018 survey titled “Smart Speaker User Survey: Questions for Sonos” reported that 53% of Google smart speaker owners chose Google again when they purchased their second smart speaker.⁵⁹⁴ As *Fast Company* explained in March 2018: “The business motivations are clear: Tech giants like...Google...see the smart home as new territory to conquer through their respective ecosystems...As a result, the more you buy into one system, the more you become locked out of others.”⁵⁹⁵ Christopher Chan, a Google employee, testified that once a consumer enters the Google ecosystem, it’s Google’s hope that they buy subsequent speakers from Google as well.⁵⁹⁶

Each hardware device added to the ecosystem also has the ability to generate even more additional revenue from Google’s valuable search and data businesses. Google’s strategy to increase the number of users who interact with Google hardware devices drives further revenue generation and increases the lifetime value of users. In the Sonos/Google IP Licensing Model, Sonos notes that “Google is using smart speakers as a ‘loss leader’ to inject Google Assistant into as many homes (and rooms) as possible, with the ultimate aim to earn profit on its core business.”⁵⁹⁷ The Sonos/Google IP Licensing Model includes reference to an article from October 2017 in *The Verge* which states that, from a hardware strategy perspective, Google’s focus “has been trying to get people connected to Google’s services in the home.”⁵⁹⁸ In addition, a *Wired* article from

⁵⁹² Bohn, D., “The Google Assistant smart home ecosystem is slowly starting to take shape,” *TheVerge.com*, <https://www.theverge.com/2018/11/14/18093872/google-assistant-smart-home-broadcast-reply-routines>.

⁵⁹³ Bohn, D., “The Google Assistant smart home ecosystem is slowly starting to take shape,” *TheVerge.com*, <https://www.theverge.com/2018/11/14/18093872/google-assistant-smart-home-broadcast-reply-routines>.

⁵⁹⁴ SONOS-SVG2-00063422-438 at 428.

⁵⁹⁵ SONOS-SVG2-00056412-428 at 415.

⁵⁹⁶ Deposition of Christopher Chan, November 29, 2022, pp. 109-110.

⁵⁹⁷ SONOS-SVG2-00041807-860 at 816.

⁵⁹⁸ Bohn, D., “Google Hardware Is No Longer a Hobby,” *TheVerge.com*, <https://www.theverge.com/2017/10/4/16405184/rick-osterloh-interview-new-google-hardware-vision-htc-deal>.



February 2018 describes how Google's hardware strategy is to "[p]ut its virtual assistant everywhere in people's lives."⁵⁹⁹ In an analyst report for Alphabet Inc. from December 2018, RBC Capital Markets stated that "[w]e believe that Google's growing Hardware segment has also generated significant strategic benefits for the company, including increased ad monetization opportunities, an end-to-end, controlled method of delivering software/product updates to consumers, and a platform to develop and deploy AI advancements."⁶⁰⁰

An October 2021 *Seattle Times* article titled "Big Tech's not-so-secret plan to monetize your home" describes how Amazon, Apple, and Google use artificial intelligence assistants inside smart speakers to "decide what information to provide you, where you can shop and how seriously to take your privacy."⁶⁰¹ Google and Amazon "are eager to give consumers a taste of their respective digital assistants, Alexa and Google Assistant, at impulse-buy prices, hoping to lock in customers and profit from later sales of goods and data about buying habits."⁶⁰² Most recently, a November 2022 article noted that while Amazon's Echo product line is among the "best-selling items on Amazon...we want to make money when people use our devices, not when they buy our devices."⁶⁰³

Google's infringement of Sonos's patented inventions has helped and will help Google generate significant revenue from driving its users to make purchases such as streaming music subscriptions and retail purchases via and for use with Google's Cast-enabled media players. For example, an NPR "smart speaker" survey found that 28% of survey respondents agreed that "[g]etting [a] Smart Speaker led [them] to pay for a music service subscription," and Google offers two such subscriptions – Google Play Music and YouTube Music.⁶⁰⁴ Likewise, the NPR survey also found that 26% of respondents use their smart speakers "regularly" to "add [items] to shopping list."⁶⁰⁵

Google has also produced a number of lifetime value analyses relating to various Google products.⁶⁰⁶

When limited to the United States, Google [REDACTED] and [REDACTED]

⁵⁹⁹ SONOS-SVG2-00041807-860 at 846.

⁶⁰⁰ SONOS-SVG2-00055463-490 at 463.

⁶⁰¹ Fowler, G., "Big Tech's not-so-secret plan to monopolize your home," *SeattleTimes.com*, <https://www.seattletimes.com/business/technology/big-techs-not-so-secret-plan-to-monopolize-your-home/>.

⁶⁰² Nellis, S., and Paresh, D., "Amazon and Google probably lost money on their smart speakers over Christmas," *BusinessInsider.com*, <https://www.businessinsider.com/amazon-and-google-probably-lost-money-on-smart-speakers-over-christmas-2018-1>.

⁶⁰³ Amadeo, R., "Amazon Alexa is a 'colossal failure,' on pace to lose \$10 billion this year," *arstechnica*, <https://arstechnica.com/gadgets/2022/11/amazon-alexa-is-a-colossal-failure-on-pace-to-lose-10-billion-this-year/>.

⁶⁰⁴ SONOS-SVG2-00042345-383 at 365.

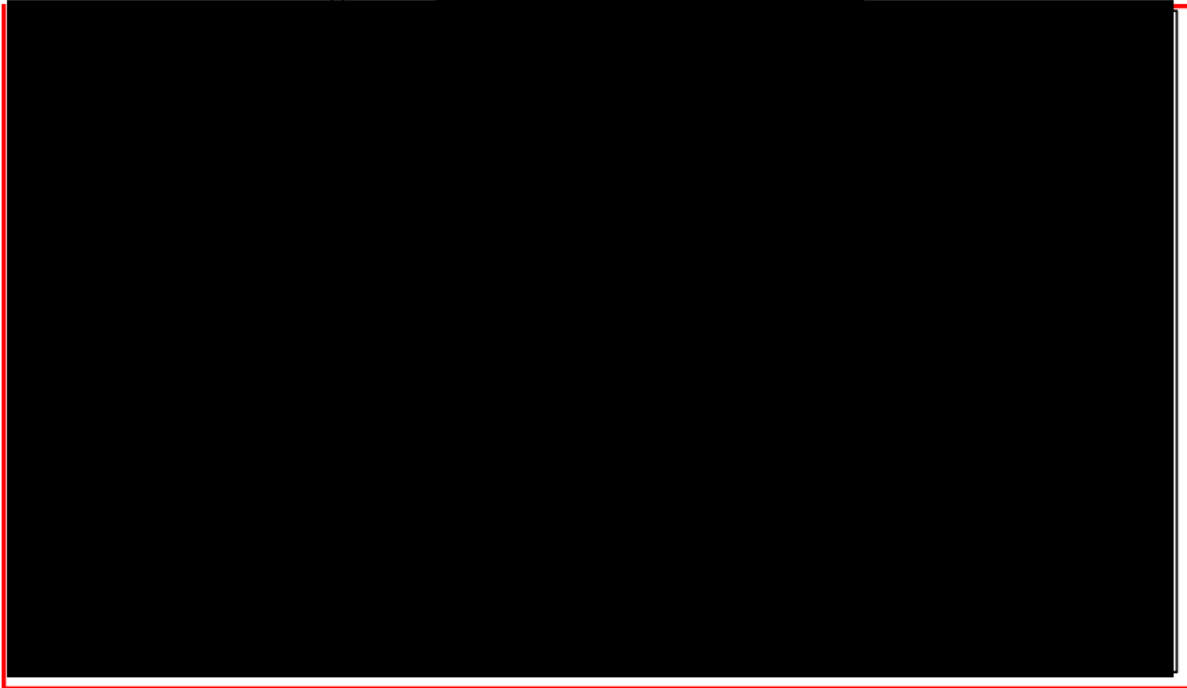
⁶⁰⁵ SONOS-SVG2-00042345-383 at 359; SONOS-SVG2-00042337-344 at 342.

⁶⁰⁶ GOOG-SONOSNDCA-00115771-813; GOOG-SONOSNDCA-00115896-913; GOOG-SONOSNDCA-00115914-925.

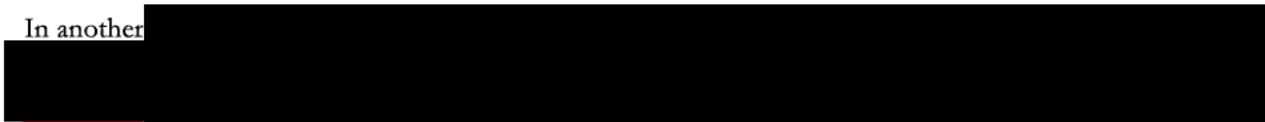
⁶⁰⁷ GOOG-SONOSNDCA-00115771-813 at 774.



Figure 47: 610



In another 611



⁶⁰⁸ GOOG-SONOSNDCA-00115771-813 at 774.

⁶⁰⁹ GOOG-SONOSNDCA-00115771-813 at 775, 780.

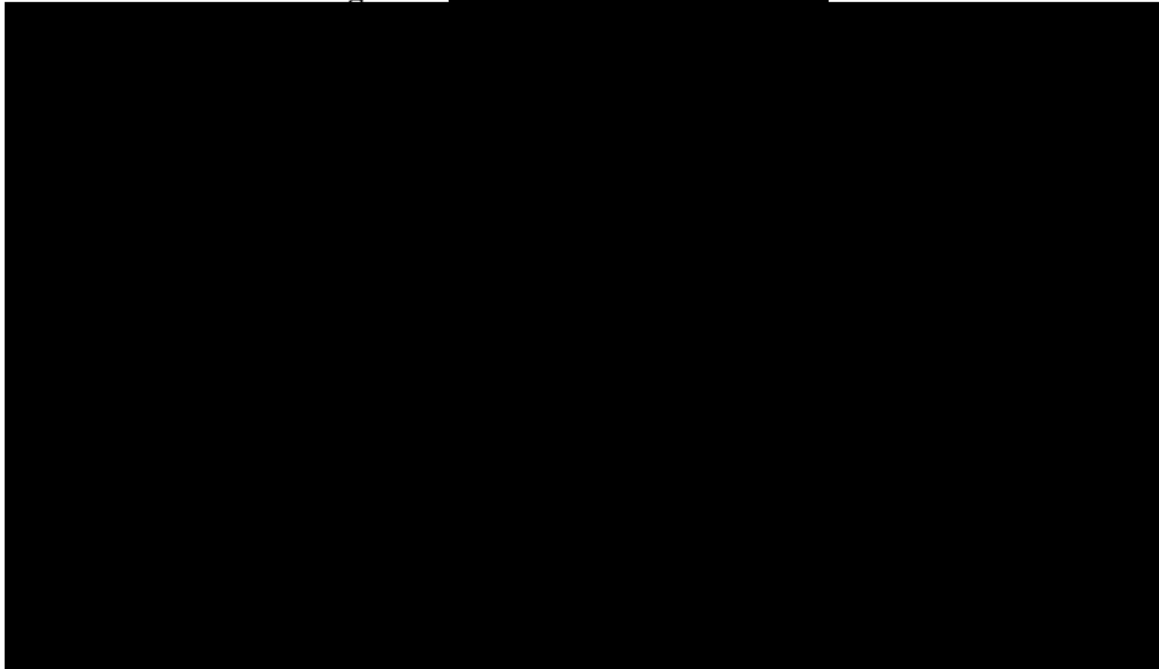
⁶¹⁰ GOOG-SONOSNDCA-00115771-813 at 775.

⁶¹¹ GOOG-SONOSNDCA-00115896-913 at 897, 911.



Figure 48:

2



In addition, this same document describes that having a

Therefore, I find that this consideration would tend to favor the licensor in this hypothetical negotiation.

Impact on Hypothetical Negotiations: Favors Licensor

14.7 Factor #7: The duration of the patent and the term of the license.

Long-term, non-exclusive licenses tend to have lower rates so as not to incentivize the licensee to design around the patented technology, implement an alternative technology or otherwise discontinue sales of a licensed product. Conversely, short-term, non-exclusive licenses tend to have higher rates.

I have assumed that the license resulting from the hypothetical negotiation would extend through the life of the '033 Patent. Assuming a hypothetical negotiation occurring during the period leading up to September 15, 2020, and the expiration of the '033 Patent occurring on or around December 30, 2031, I consider the term of the license to be approximately 11.5 years.⁶¹⁴ I would consider this to be a long-term license.

⁶¹² GOOG-SONOSNDCA-00115896-913 at 913.

⁶¹³ GOOG-SONOSNDCA-00115896-913 at 898.

⁶¹⁴ U.S. Patent No. 10,779,033, p. 1; "US10779033," *Google Patents*, <https://patents.google.com/patent/US10779033B2/en?q=10779033>.



I have similarly assumed that the license resulting from the hypothetical negotiation would extend through the life of the '885 Patent. Assuming a hypothetical negotiation occurring during the period leading up to November 24, 2020, and the expiration of the '885 Patent occurring on or around September 11, 2027, I consider the term of the license to be approximately 6.5 years.⁶¹⁵ I would consider this to be a mid-to-long-term license.

I have similarly assumed that the license resulting from the hypothetical negotiation would extend through the life of the '966 Patent. Assuming a hypothetical negotiation occurring during the period leading up to November 5, 2019, and the expiration of the '966 Patent occurring on or around September 11, 2027, I consider the term of the license to be approximately 7.5 years.⁶¹⁶ I would consider this to be a mid-to-long-term license.

Therefore, I find that this consideration would tend to favor the licensee in this hypothetical negotiation.

Impact on Hypothetical Negotiations: Favors Licensee

14.8 Factor #8: The established profitability of the product made under the patent; its commercial success; and its current popularity.

The profitability, commercial success, and popularity of the products made under the Asserted Patents are illustrated by the profitability, commercial success, and popularity of Sonos's Patent-Practicing Products and Google's Accused Instrumentalities.

As discussed in Section 9, the Sonos devices which practice the Zone Scene Patents include the Sonos One, Sonos Play:5, and Sonos Five.⁶¹⁷ These products are sold in the Sonos speakers revenue category.⁶¹⁸ A substantial majority of Sonos revenue comes from sales of its speakers.⁶¹⁹

As shown in the figure below, from fiscal year 2016 through fiscal year 2022, Sonos generated \$4.1 billion in gross profit on \$9.1 billion in sales, for an average gross profit margin percentage of 44.6%.⁶²⁰ Sonos's gross profit margin percentage on sales increased from 44.8% in fiscal year 2016 to 45.4% in fiscal year 2022.⁶²¹

⁶¹⁵ U.S. Patent No. 10,848,885; "US10848885," *Google Patents*, <https://patents.google.com/patent/US10848885B2/en?q=10848885>.

⁶¹⁶ U.S. Patent No. 10,469,966, p. 1; "US10469966," *Google Patents*, <https://patents.google.com/patent/US10469966B2/en?q=10469966>.

⁶¹⁷ Sonos, Inc.'s Preliminary Damages Disclosure Pursuant to Patent Local Rule 3-8, January 25, 2022, p. 7.

⁶¹⁸ Sonos, Inc. Form 10-K for the fiscal year ended October 2, 2021, p. 5.

⁶¹⁹ Sonos, Inc. Form 10-K for the fiscal year ended October 2, 2021, p. 40.

⁶²⁰ Appendix 9.1.

⁶²¹ Appendix 9.1.

**Figure 49: Sonos's Company-wide Gross Profitability**⁶²²

<i>(in thousands USD)</i>	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Total
Revenue	\$ 901,284	\$ 992,526	\$ 1,137,008	\$ 1,260,823	\$ 1,326,328	\$ 1,716,744	\$ 1,752,336	\$ 9,087,049
Cost of Revenue	497,885	536,461	647,700	733,480	754,372	906,750	955,969	5,032,617
Gross Profit	\$403,399	\$456,065	\$ 489,308	\$ 527,343	\$ 571,956	\$ 809,994	\$ 796,367	\$4,054,432
<i>Gross Profit Margin %</i>	44.8%	45.9%	43.0%	41.8%	43.1%	47.2%	45.4%	44.6%

As discussed in Section 8.1, the '033 Accused Pixel Instrumentalities are composed of Google's smartphone device, tablets, and computers. As shown in the figure below, from September 15, 2020 through Q3 2022, Google lost [REDACTED] in gross profit on [REDACTED] in net sales of the '033 Accused Pixel Instrumentalities, for an average gross profit margin percentage of [REDACTED].⁶²³

Figure 50: Google's Gross Profitability for the '033 Accused Pixel Instrumentalities⁶²⁴

	Sep. 15 - Dec. 31			
	Q3 - Q4 2020	2021	Q1 - Q3 2022	Total
'033 Accused Pixel Instrumentalities Net Revenue	[REDACTED]			
Cost of Sales				
Gross Profit				
<i>Gross Profit Margin %</i>				

As discussed in Section 8.2, the '885 Accused Instrumentalities are composed of Google's cast-enabled media players, such as Home Mini, Nest Mini, Home, Home Max, Home Hub, Nest Hub, Nest Hub Max, Nest Audio, Nest WiFi Point, Chromecast, Chromecast Audio, Chromecast Ultra, Chromecast with Google TV, and Chromecast with Google TV (HD). As shown in the figure below, from November 24, 2020 through Q3 2022, Google lost [REDACTED] in gross profit on \$ [REDACTED] in net sales of the '885 Accused Instrumentalities, for an average gross profit margin percentage of [REDACTED].⁶²⁵

Figure 51-S: Google's Gross Profitability for the '885 Accused Instrumentalities⁶²⁶

	Nov. 24 - Dec. 31			
	Q4 2020	2021	Q1 - Q3 2022	Total
'885 Accused Instrumentalities Net Revenue	[REDACTED]			
Cost of Sales				
Gross Profit				
<i>Gross Profit Margin %</i>				

⁶²² Appendix 9.1.⁶²³ Appendix 8.3.⁶²⁴ Appendix 8.3.⁶²⁵ Appendix 8.4-S.⁶²⁶ Appendix 8.4-S.



As discussed in Section 8.3, the '966 Accused Instrumentalities are composed of devices that have installed the Google Home app. However, Google has not provided sufficient information to calculate net revenue or gross profit associated with such devices. I estimate that approximately 169.5 million devices have installed the Google Home app over the relevant infringement period.⁶²⁷ Based on the above financial information, it is clear that there is strong demand for the Accused Instrumentalities which use the patented inventions.

In the context of the hypothetical negotiation, Sonos and Google would recognize that the Accused Instrumentalities provide Google various means to generate revenue. Not only does Google make profits on the sale of cast-enabled devices and hardware products, but Google relies upon the subscription fees and advertising revenue generated through consumer usage of these cast-enabled devices and hardware products. In particular, the parties would consider Google's advertising revenue and profitability and Google's subscription revenue and profitability, in addition to considering the sales of Google's actual device and hardware products.

On YouTube ads generated by the '033 Accused Pixel Instrumentalities in the U.S. from Q3 2020 through Q3 2022, Google made [REDACTED] in gross profit on [REDACTED] in revenue, for an average gross profit margin percentage of [REDACTED].⁶²⁸ Google's gross profit margin percentage on YouTube ads generated by the '033 Accused Pixel Instrumentalities in the U.S. increased from [REDACTED] in Q3 2020 to [REDACTED] in Q3 2022.⁶²⁹

Figure 52-S: YouTube U.S. Ad Gross Profit for the '033 Accused Pixel Instrumentalities⁶³⁰

	Sep. 15 - Sep. 30				
	<u>Q3 2020</u>	<u>Q4 2020</u>	<u>Q1 2021</u>	<u>Q2 2021</u>	<u>Q3 2021</u>
YT U.S. Ad Revenue - '033 Accused Pixel Instrumentalities					
YT Advertising Gross Margin %					
YT U.S. Ad Margin - '033 Accused Pixel Instrumentalities					
YT U.S. Ad Revenue - '033 Accused Pixel Instrumentalities					
YT Advertising Gross Margin %					
YT U.S. Ad Margin - '033 Accused Pixel Instrumentalities					
YT U.S. Ad Revenue - '033 Accused Pixel Instrumentalities					
YT Advertising Gross Margin %					
YT U.S. Ad Margin - '033 Accused Pixel Instrumentalities					

On YouTube subscriptions generated by the '033 Accused Pixel Instrumentalities in the U.S. from Q3 2020 through Q3 2022, Google made [REDACTED] in gross profit on [REDACTED] in revenue, for an average gross profit margin percentage of [REDACTED].⁶³¹ Google's gross profit margin percentage on YouTube subscriptions

⁶²⁷ Appendix 7.4.

⁶²⁸ Appendix 5.2.1.1-S.

⁶²⁹ Appendix 5.2.1.1-S.

⁶³⁰ Appendix 5.2.1.1-S.

⁶³¹ Appendix 5.2.2.1-S.



generated by the '033 Accused Pixel Instrumentalities in the U.S. increased from [REDACTED] in Q3 2020 to [REDACTED] in Q3 2022.⁶³²

Figure 53-S: YouTube U.S. Subscription Gross Profit for the '033 Accused Pixel Instrumentalities⁶³³

	Sep. 15 - Sep. 30				
	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021
YT U.S. Subscription Revenue - '033 Accused Pixel Instrumentalities	[REDACTED]				
YT Subscription Gross Margin %					
YT U.S. Subscription Margin - '033 Accused Pixel Instrumentalities					
YT U.S. Subscription Revenue - '033 Accused Pixel Instrumentalities					
YT Subscription Gross Margin %					
YT U.S. Subscription Margin - '033 Accused Pixel Instrumentalities					
YT U.S. Subscription Revenue - '033 Accused Pixel Instrumentalities					
YT Subscription Gross Margin %					
YT U.S. Subscription Margin - '033 Accused Pixel Instrumentalities					

I have not been provided with financial documents identifying additional ad or subscription revenue which was generated by the '885 Accused Instrumentalities. Similarly, I have not been provided with financial documents identifying additional ad or subscription revenue which was generated by the '966 Accused Instrumentalities.

Google enjoys substantial revenue and gross profits from the Accused Instrumentalities, which are both popular and commercially successful. Therefore, I find that this consideration would tend to favor the licensor in this hypothetical negotiation.

Impact on Hypothetical Negotiation: Favors Licensor

14.9 Factor #9: The utility and advantages of the patented property over old modes or devices, if any, that had been used for working out similar results.

14.10 Factor #10: The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.

Factors 9 and 10 are frequently analyzed together due to their similarity and inherent overlap.

As discussed in Section 6.1, I understand that Sonos contends that Google infringes claims 1-2, 4, 9, 11-13, and 16 of the '033 Patent.⁶³⁴ Based upon the Opening Schmidt Report, I understand that the '033 Patent's

⁶³² Appendix 5.2.2.1-S.

⁶³³ Appendix 5.2.2.1-S.

⁶³⁴ Opening Schmidt Report, p. 4.



direct control technology enables a user to transfer play back of media from a personal computing device, such as a mobile phone, to one or more playback devices, such as a smart speaker, and thereafter control the playback on the one or more playback devices via the user's personal computing device.⁶³⁵

According to Dr. Almeroth:

*The '885 and '966 Patents are directed to Sonos's "zone scene" technology, which, at the time of the invention, provided a new way of grouping networked media players such as smart speakers together for synchronous playback of media.*⁶³⁶

As discussed in Section 6.2, I understand that Sonos contends that Google infringes claim 1 of the '885 Patent. This claim cover aspects of Sonos's zone scene technology from the perspective of a zone player, such as a speaker.⁶³⁷ According to the Dr. Almeroth, "Google and its customers derive substantial benefit from Google's use of the claimed technology of the '885 Patent and '966 Patent in the Accused Google Controllers and Accused Google Players."⁶³⁸

Dr. Almeroth states that, "the claimed 'zone scene' technology enables Google's customers to use the Accused Google Controllers to create and save predefined groups (referred to by Google as 'speaker groups' or 'static groups') of Accused Google Players, including groups that have one or more overlapping Accused Google Players, where each such group can later be launched at any time via the Accused Google Controllers to cause the Accused Google Players in the previously-saved, predefined group to become configured to play back audio in synchrony. In this regard, the claimed technology provides significant advantages."⁶³⁹

The Opening Almeroth Report explained the following regarding the time-saving advantage of the claimed 'zone scene' technology:

For instance, the ability to use the Accused Google Controllers to create and save predefined speaker groups of Accused Google Players that can later be launched on demand for synchronized playback provides advantages over other technology for grouping "zone players" in a networked multi-zone audio system that requires a user to create a group from scratch each time the user wishes to listen to synchronized audio on a different group by selecting the particular "zone players" to include in the group in an ad-hoc manner, one-by-one, at the time that the group is to be activated for synchronous playback... As the '885 Patent notes, this ad-hoc grouping process "may sometimes be quite time consuming," because each time the user wishes to activate a different group for synchronous playback, the user has to repeat the ad-hoc process of selecting each of the "zone players" to include in the group even if it is a grouping of "zone players" that has previously been formed and activated by the user on many other occasions in the past... By incorporating Sonos's claimed "zone scene" technology into the Accused Google Controllers and the Accused Google Players, a user can create and save as many speaker groups as desired using the Google Home app, and then later listen to synchronized audio on any one of the pre-saved speaker groups on demand by simply selecting the speaker group for launch via, for example, the Google Home app, Google's YouTube Music app, or the Spotify app. This is advantageous because instead of having to create

⁶³⁵ Opening Schmidt Report, pp. 12-19.

⁶³⁶ Opening Almeroth Report, p. 33.

⁶³⁷ Opening Almeroth Report, pp. 39-40.

⁶³⁸ Opening Almeroth Report, p. 304.

⁶³⁹ Opening Almeroth Report, p. 304.



*each group from scratch by selecting the Accused Google Players to include in the speaker group in a “time consuming” ad-hoc manner at the time the user wishes to activate the group for synchronous playback, the user can simply select a pre-saved speaker group for launch.*⁶⁴⁰

The ability to create and save multiple predefined speaker groups with one or more overlapping Accused Google Players provides advantages with respect to system flexibility.⁶⁴¹ Using the ’885 Patent claimed technology, a user can listen to synchronous audio on different speaker groups in their home at different times where each speaker group includes an overlapping Accused Google Player.⁶⁴² Such flexibility was not possible with “conventional multi-zone audio system[s].”⁶⁴³

The claimed zone scene technology allows a user the ability to create and save a predefined speaker group of Accused Google Players for future use, without causing the speaker group to be activated for synchronous playback.⁶⁴⁴ This is particularly advantageous for a user who has no intention on using a new speaker group at the time of its creation but is instead proactively creating and saving a speaker group for future use.⁶⁴⁵

The claimed zone scene technology also “allows a user to create and save predefined speaker groups using the Google Home app on an Accused Google Controller but then later launch any one of the previously-saved, predefined speaker groups by selecting the speaker group via a different Cast-enabled app such as Google’s YouTube Music app or the Spotify app, which are both media content streaming apps.”⁶⁴⁶ This capability is advantageous for users who prefer to control their Accused Google Players from a third party media content streaming app.⁶⁴⁷ Without the ’885 Patent claimed technology, a user would not be able to launch a speaker group for synchronous playback via the YouTube Music app or Spotify app.⁶⁴⁸

The same can be said for the ’966 Patent, which also covers Sonos’s zone scene technology, albeit from the perspective of a computing device or controller, such as a smartphone. Therefore, I find that this consideration would tend to favor the licensor in this hypothetical negotiation.

Impact on Hypothetical Negotiation: Favors Licensor

14.11 Factor #11: The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use.

As described above, I understand that the asserted claims of the ’033 Patent enables a user to transfer play back of media from a personal computing device, such as a mobile phone, to one or more playback devices,

⁶⁴⁰ Opening Almeroth Report, pp. 304-305. Internal cites omitted.

⁶⁴¹ Opening Almeroth Report, p. 305.

⁶⁴² Opening Almeroth Report, p. 305.

⁶⁴³ Opening Almeroth Report, p. 305.

⁶⁴⁴ Opening Almeroth Report, p. 305.

⁶⁴⁵ Opening Almeroth Report, p. 306.

⁶⁴⁶ Opening Almeroth Report, p. 307.

⁶⁴⁷ Opening Almeroth Report, p. 307.

⁶⁴⁸ Opening Almeroth Report, p. 307.



such as a smart speaker, and thereafter control the playback on the one or more playback devices via the user's personal computing device.⁶⁴⁹ As found in internal Google documents, public articles, and Google marketing materials, the Accused Instrumentalities have throughout the damages period, enjoyed immense popularity, and widespread success among customers.

As discussed in Section 12.2.1 above, I have reviewed internal Google documents which provide usage data for various metrics related to time spent watching or listening to media via YouTube, YouTube Music, YouTube Kids, and YouTube TV. Specifically, Google produced documents relating to MDx Playback Time metrics that provides usage data related to time spent watching or listening to media via YouTube, YouTube Music, YouTube Kids, and YouTube TV in the United States from July 2018 through October 2022.⁶⁵⁰ For example, in the source document,

[REDACTED]

⁶⁵² I rely on this figure below to calculate incremental revenue generated by the '033 Accused Pixel Instrumentalities.

Therefore, I calculated the portion of total time spent watching YouTube while using Direct Control, which resulted in [REDACTED]⁶⁵³ Given the other evidence discussed below, I believe that this is a conservative measure of the prevalence of Direct Control usage by Google customers. Dr. Schmidt also opined that he has reviewed "evidence of Google documenting and touting the widespread use of the accused Cast functionality facilitated by Google's MDx/Orbit architecture that practices the asserted claims of the '033 Patent."⁶⁵⁴

Other data relating to the prevalence of casting usage by Google consumers, such as a Q2 2019 presentation on the current casting user interface and new features, indicate that [REDACTED]

[REDACTED]⁶⁵⁵ The figure below, taken directly from that presentation, calculates that [REDACTED]⁶⁵⁶

⁶⁴⁹ Opening Schmidt Report, pp. 12-19.

⁶⁵⁰ GOOG-SONOSNDCA-00116342; updated at GOOG-SONOSNDCA-00117796.

⁶⁵¹ Deposition of James Goddard, July 19, 2022, pp. 42-45; GOOG-SONOSNDCA-00116342; GOOG-SONOSNDCA-00117796; discussions with Counsel. The spreadsheet reflects hours of U.S. watch time.

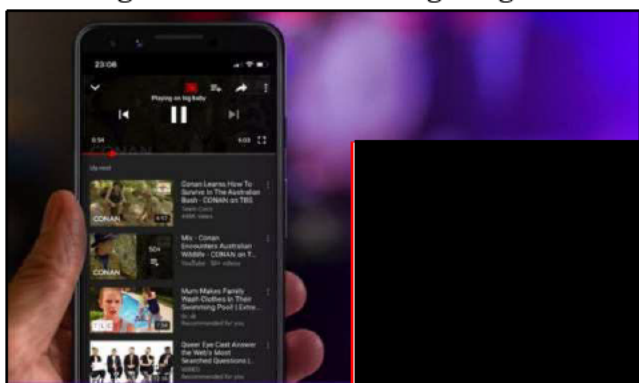
⁶⁵² Deposition of James Goddard, July 19, 2022, pp. 64-66; Appendix 5.5. If, however, one includes manually paired casting hours, this share rises to 1.97%.

⁶⁵³ Calculated as $(5,171,677,769 / 298,455,152,939 = 1.73\%)$.

⁶⁵⁴ Opening Schmidt Report, pp. 141-142.

⁶⁵⁵ GOOG-SONOSWDTX-00051544-607 at 546.

⁶⁵⁶ GOOG-SONOSWDTX-00051544-607 at 546. Emphasis in original.

**Figure 54: YouTube Casting Usage**⁶⁵⁷




On the qualitative side, numerous Google webpages focus on enabling customers using Direct Control features, through Google Nest, Google Home speakers, YouTube.com, the YouTube app, and Chrome. The figures below are presented as examples of this marketing by Google.

Figure 55: Google Marketing of Direct Control via YouTube.com and YouTube App⁶⁵⁸

Cast from the YouTube app and YouTube.com

Watching your favorite YouTube videos on your TV has never been easier.

Cast from YouTube

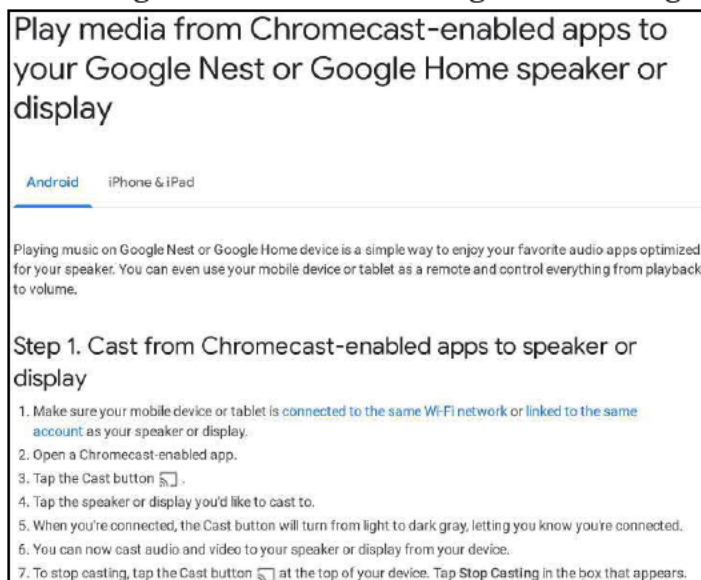
1. Make sure your mobile device or computer is connected to the same Wi-Fi network as Chromecast.
2. Open the YouTube app  or YouTube.com.
3. Tap the **Cast** button . **Tip:** On the YouTube app, the Cast button is at the top of the Home screen. From YouTube.com on your laptop, it's in the bottom right corner of the player.
Note: You can also open YouTube.com and [cast directly from Chrome browser](#).
4. Tap the Chromecast device you want to cast to > tap **Play**. Your content will start playing on the TV connected to that Chromecast device.
5. To stop casting content, tap the **Cast** button  > **Disconnect**.

⁶⁵⁷ GOOG-SONOSWDTX-00051544-607 at 546.

⁶⁵⁸ GOOG-SONOSWDTX-00005981.



Figure 56: Google Marketing of Direct Control via Google Nest or Google Home Speaker⁶⁵⁹



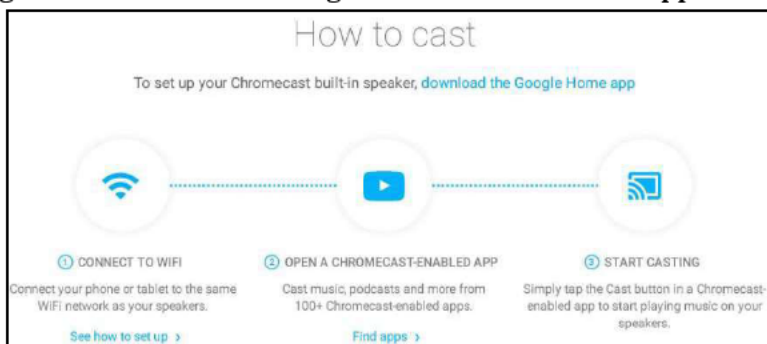
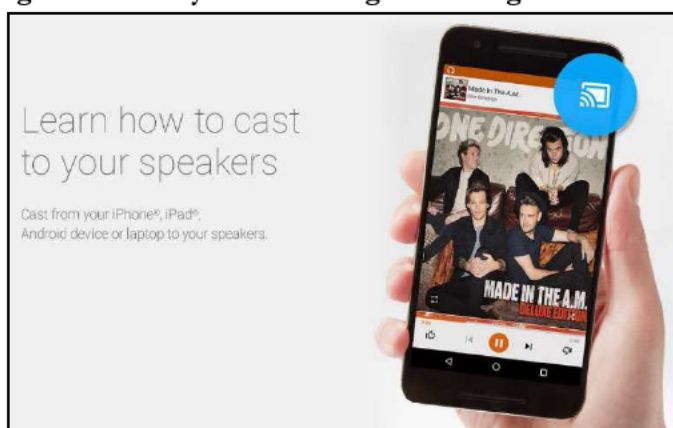
Google also promotes the ability to cast from non-Google hardware as well. The figures below depict instructions of how to cast from Chromecast-enabled applications, as well as Apple products such as the iPhone or iPad. By May 2015, just two years after it was released, Chromecast dongle had sold over 17 million units worldwide, according to then-Head of Android Sundar Pichai.⁶⁶⁰ Similarly, an article published by Google on Chromecast states that “people are tapping the Cast button more than ever. And since Chromecast, the Made by Google family of products has continued to grow, bringing the best of hardware, software, and AI together.”⁶⁶¹ As the I/O 2015 keynote speaker, Mr. Pichai stated that the Play Store was home to around 20,000 Cast-ready apps.⁶⁶²

⁶⁵⁹ GOOG-SONOSWDTX-00005631-636 at 631.

⁶⁶⁰ Roettgers, J., “Google Sells 17 Million Chromecast Devices, Clocks 1.5 Billion Casts,” *Variety*, <https://variety.com/2015/digital/news/google-sells-17-million-chromecast-devices-clocks-1-5-billion-casts-1201506974/#>.

⁶⁶¹ GOOG-SONOSWDTX-00008118-119 at 118.

⁶⁶² Herrick, J., “Chromecast sales approach 20 million, people just love the Cast button,” *Talk Android*, <https://www.talkandroid.com/250517-chromecast-sales-approach-20-million-people-just-love-cast-button/>.

**Figure 57: How to Cast Using a Chromecast-Enabled Application**⁶⁶³**Figure 58: Ability to Cast Using Non-Google Hardware**⁶⁶⁴

Internal Google documents reflect this focus on developer enablement as well – a 2016 presentation titled “Introducing the New Google Cast SDK” noted that Google has “enabled [casting on] thousands of apps around the Globe, from HBO to Netflix, Spotify, to YouTube, the NBA, Hulu, and games like Just Dance Now”⁶⁶⁵ Additionally, a presentation meant for Google’s 2016 developer conference, I/O, in 2016, identified ways that Google was “building integrated experiences for the living room.”⁶⁶⁶ These included work with Vizio “to launch their line of SmartCast TV’s with Cast built in” as well as development efforts with other TV manufacturers, which would “enable[] Cast for millions more consumers – making it one device with nothing to plug in – running Cast.”⁶⁶⁷ The figure below identifies the TV manufacturers Google was working with at the time.

Figure 59: Google Cast for TV Manufacturers⁶⁶⁸

⁶⁶³ GOOG-SONOSWDTX-00005760-761 at 760.

⁶⁶⁴ GOOG-SONOSWDTX-00005760-761 at 760.

⁶⁶⁵ GOOG-SONOSWDTX-00039410-457 at 417.

⁶⁶⁶ GOOG-SONOSWDTX-00039359-409 at 360.

⁶⁶⁷ GOOG-SONOSWDTX-00039359-409 at 366-367.

⁶⁶⁸ GOOG-SONOSWDTX-00039359-409 at 367.

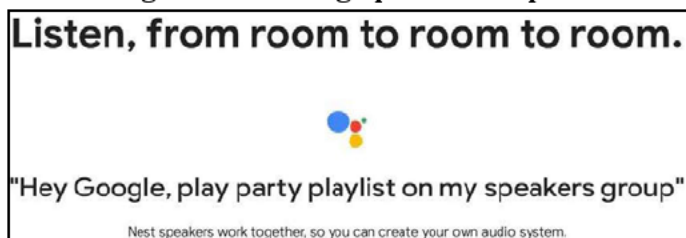


While I was able to quantify casting's share of YouTube watch time, I understand that Google has not produced any data relating to the prevalence, usage, and/or intensity of such usage regarding its speaker grouping or zone scene technology. As such, I again identified numerous marketing documents that indicate such capabilities are expected from, and therefore extensively used by, Google consumers. The figures below display Google's marketing the ability to group speakers (among other devices), allowing a user to "create your own audio system."

Figure 60: Grouping Google Assistant Devices⁶⁶⁹



⁶⁶⁹ GOOG-SONOSWDTX-00005768-769 at 768.

Figure 61: Creating Speaker Groups⁶⁷⁰

Google also promotes the ability to group Nest speakers in multiple saved configurations: “If you have more than one Google or Nest smart speaker or display, simply create as many different groups as you’d like in the Google Home app, and enjoy music, podcasts and more throughout your home.”⁶⁷¹

I also understand that Dr. Schmidt has opined that the ’033 Patent provides significant advantages in the field of networked, multimedia playback systems, such as Google’s Chromecast, Home, and Nest multimedia systems, and is foundational technology in this field.⁶⁷² Further, Dr. Schmidt stated:

I further note that I have seen evidence of Google recognizing the importance of the technology of the Asserted Claims of the ’033 Patent. For example, I have seen evidence of Google documenting and touting the widespread use of the accused Cast functionality facilitated by Google’s MDx/Orbit architecture that practices the asserted claims of the ’033 Patent. See, e.g., GOOG-SONOSWDTX-00042838 [Orbit: Project Portal], 839 (‘

[REDACTED]

GOOG-SONOSWDTX-00037264 [Orbit & Cassini Deep Dive], 271 (setting forth “[t]op line metrics” related to Casting).⁶⁷³

Regarding the Zone Scene Patents, Dr. Almeroth provided examples of Google’s use of the claimed technology:

For instance, Google markets both the ability to create and save predefined speaker groups for future use via the Google Home app on an Accused Google Controller and the ability of Accused Google Players in a speaker group to playback audio in synchrony. See, e.g., GOOG-SONOSWDTX-00007068-74 at 68 (Google webpage marketing ability to “[g]roup any combination of Google Nest or Google Home speakers and displays and Chromecast devices together for synchronous music throughout the home.”); GOOG-SONOSWDTX-00008449-50 at 49 (Google webpage marketing ability to “group any combination of Google Nest speakers, displays, and Chromecast devices together to play music in multiple rooms...”); SONOS-SVG2-00055666-668 at 66 (Google webpage marketing ability to “group any combination of Google Nest or Home speakers and displays, and Chromecast devices together to play music in multiple rooms...”); SONOS-SVG2-00055660-661 at 60 (Google webpage marketing ability to “create groups of

⁶⁷⁰ GOOG-SONOSWDTX-00006518-520 at 518.

⁶⁷¹ GOOG-SONOSWDTX-00005212-214 at 212.

⁶⁷² Opening Schmidt Report, p. 139.

⁶⁷³ Opening Schmidt Report, pp. 141-142.



speakers, Smart Displays, and Smart Clocks so all of your devices play the same audio throughout your house.”); SONOS-SVG2-00055113 (Google marketing video touting ability to create and save speaker groups).

Similarly, Google’s internal documents also recognize the importance of being able to play synchronous audio on speaker groups of Accused Google Players. See, e.g., GOOG-SONOSWDTX-00040384 at 85 (document titled “Multizone Audio Design” stating “[t]he primary goal of multiroom audio is to play out the audio in sync across all the devices in a group”); GOOG-SONOSNDCA-00056732-77 at 38.⁶⁷⁴

Given the quantitative factors indicating extensive use of the direct control technology, along with qualitative factors of zone scene usage and promotion from Google marketing materials, I believe that Google has made extensive use of the Accused Instrumentalities. Therefore, I find that this consideration would tend to favor the licensor in this hypothetical negotiation.

Impact on Hypothetical Negotiation: Favors Licensor

14.12 Factor #12: The portion of the profit or the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions.

Similar to Factors #1 and #2, Factor #12 also relates to the Market Approach and considers licenses and licensing practices within the relevant industry.

As above, I have considered relevant agreements in my use of the Market Approach. Therefore, the impact of this factor is reflected in my quantitative analysis described above in Section 12.1.

Impact on Hypothetical Negotiation: Considered in Market Approach

14.13 Factor #13: The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer.

Factor 13 extends the analysis performed in Factors #8 and #11 and relates to the portion of the realizable profit that should be attributed to non-patented elements. Analysis of this factor is sometimes related to the Income Approach in the context of intellectual property valuation, which I have addressed above in Section 12.2. As discussed above, the Income Approach attempts to value an asset by measuring the benefits derived from use of the asset. When used in the context of an intellectual property licensing situation, these benefits are then split in some fashion between the licensee and licensor. The split has the twin effects of giving the licensor reasonable compensation for the use of its intellectual property, and the licensee reasonable compensation for assuming the business risks associated with developing, manufacturing, promoting, and selling the product that embodies the particular technology.

In apportioning the realizable value of the Asserted Patents between Sonos and Google, I have considered Google’s reputation, its promotional efforts, and the normal business risks incurred by Google, as well as

⁶⁷⁴ Opening Almeroth Report, p. 308.



their know-how related to the Accused Instrumentalities. In the context of the Asserted Patents, Sonos would act similarly to an app developer who wishes to provide its technology for a fee. This is comparable to the companies who offer the comparable casting applications which I discuss in Section 12.1.5. These comparable applications are offered on the Google Play Store and generate revenue either through advertisements or paid subscriptions. Similarly, with respect to the '885 Patent and '966 Patent, IFTTT is also provided as a subscription-based plan. Therefore, I consider Sonos to be similar in the regard that it would provide the technology claimed in the Asserted Patents based on this business model. In this case, Sonos and Google would look to Google's "Services fees" which are provided on a Google Support webpage. Specifically, the service fee for developers with earnings in excess of \$1M per year is 30%.⁶⁷⁵

Figure 62: Google Play Store Service Fees⁶⁷⁶

Service fees

Apps and in-app products sold through Google Play's billing system or an Additional Billing System (as defined below) in accordance with the Payments policy are subject to a service fee.

As of January 1, 2022, that service fee is equivalent to:

- For developers who are enrolled in the 15% service fee tier, the service fee is:
 - 15% for the first \$1M (USD) of earnings each year,
 - 30% for earnings in excess of \$1M (USD) each year.
- For developers who are not enrolled in the 15% service fee tier, the service fee is 30%.
- For automatically renewing subscription products purchased by subscribers, the service fee is 15%.

I understand that this business model is already in use and widely accepted by app developers and Google. For instance, to list an app on the Google Play Store, Google charges a 30% "standard commission on apps and in-app purchases of digital goods and services."⁶⁷⁷ Additionally, Google has entered into a revenue-sharing agreement with Apple in which it paid \$1 billion to keep search bar on the iPhone.⁶⁷⁸ This agreement would give Apple a percentage of the revenue Google generates through the Apple device – this rate was testified during pretrial information to be 34%.⁶⁷⁹

Therefore, the revenue split between an app developer who is providing an application and Google who is hosting the application on the Play Store, has already been decided and appropriately compensates each party for the risks it bears. In my opinion, at the hypothetical negotiation, the parties would consider that, had

⁶⁷⁵ Google, "Service Fees," *Google.com*, <https://support.google.com/googleplay/android-developer/answer/112622?hl=en>.

⁶⁷⁶ Google, "Service Fees," *Google.com*, <https://support.google.com/googleplay/android-developer/answer/112622?hl=en>.

⁶⁷⁷ Google, "Service Fees," *Google.com*, <https://support.google.com/googleplay/android-developer/answer/112622?hl=en>; Campbell, I., and Alexander, J., "A Guide to Platform Fees," *TheVerge.com*, <https://www.theverge.com/21445923/platform-fees-apps-games-business-marketplace-apple-google>.

⁶⁷⁸ SONOS-SVG2-00056406-407.

⁶⁷⁹ SONOS-SVG2-00056406-407.



Google had a license to sell Sonos's Direct Control and Zone Scene technology, the business relationship would be similar to that with an app developer. To appropriately account for Google's contribution to the incremental revenue and margins it has generated through the Asserted Patents, Google would receive 30% and Sonos would receive 70%.

Therefore, I find that this consideration would tend to favor the licensor in this hypothetical negotiation.

Impact on Hypothetical Negotiation: Favors Licensor

14.14 Factor #14: The opinion testimony of qualified experts.

The extent to which I have considered the opinion testimony of qualified experts is reflected throughout my report. I reserve the right to supplement my opinions upon the review of other expert reports and testimony that are provided after the date of this report.

Impact on Hypothetical Negotiations: Considered Throughout My Report

14.15 Factor #15: The royalty that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee – who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention – would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license.

Factor #15 describes the integration of the other factors within the willing buyer/willing seller hypothetical negotiation framework. As the name implies, the parties in the negotiation are presumed to be willing. They both seek, as businesspersons, to reach an agreement. Another key factor in this hypothetical negotiation is that both parties are assumed to "lay their cards on the table" so that each understands the other's position. Lastly, the hypothetical negotiation considers facts that are known or knowable at the time and presumes that the Asserted Patents are valid and infringed by the Accused Instrumentalities.

Some of the considerations discussed throughout this report which would frame the hypothetical negotiation are summarized below:

- The parties would have considered that neither Sonos nor Google have entered into technically and economically comparable license agreements which can be used to determine an appropriate royalty rate indicator;
- The parties would have considered third-party comparable applications and would have considered a \$1.99 one-time subscription fee per device to be an appropriate quantitative indicator for the '033 Patent;
- The parties would have considered the incremental per-device advertising and subscription revenue attributable to the '033 Patent of \$1.12 and \$0.27, respectively to be appropriate quantitative indicators for the '033 Patent;



- The parties would have considered the apportioned net present value of the zone scene technology of \$1.24 to \$2.48 per device to be appropriate quantitative indicators for the '885 Patent;
- The parties would have considered the apportioned net present value of the zone scene technology of \$1.17 to \$2.35 per device to be appropriate quantitative indicators for the '966 Patent;
- The parties would have considered that Google's hardware products are sold as a loss leader to increase the Google ecosystem and the lifetime value of users through advertising and subscriptions;
- The parties would have considered the technical utility and advantages of the Asserted Patents and the lack of non-infringing, commercially acceptable alternatives;
- The parties would have considered Google's services fees for application developers of 30% and Sonos's share of 70% as fair sharing of the value of the Asserted Patents.

In consideration of the *Georgia-Pacific* Factors, it is my opinion that Sonos would be in a relatively stronger bargaining position than Google in the hypothetical negotiation in this case. Based upon Google's demonstrated revenue sharing with app developers, it is my opinion that Sonos would keep 70% of the revenue generated from Google's infringing use. Therefore, I have applied Sonos's 70% revenue share to each of the quantitative indicators I have calculated above which are based upon revenue as a starting point. With respect to the affirmative direct control revenue methodology described in Section 14.13, I have applied the 70% share to the advertising revenue direct control quantitative indicator of \$1.12 resulting in an advertising revenue royalty rate due Sonos of \$0.79.⁶⁸⁰ I have similarly applied the 70% share to the subscription revenue direct control quantitative indicator of \$0.27 resulting in a subscription royalty rate due Sonos of \$0.19.⁶⁸¹

Figure 63: '033 Patent Advertising Revenue Royalty Rate⁶⁸²

Description	Value
Advertising Revenue - '033 Patent Quantitative Indicator	\$ 1.12
Sonos's Share of Revenue Based on Revenue Split	70.0%
Advertising Revenue Royalty Rate	\$ 0.79

⁶⁸⁰ Appendix 5.1.1.

⁶⁸¹ Appendix 5.1.2-S.

⁶⁸² Appendix 5.1.1.

**Figure 64-S: '033 Patent Subscription Revenue Royalty Rate**⁶⁸³

Description	Value
Subscription Revenue - '033 Patent Quantitative Indicator	\$ 0.27
Sonos's Share of Revenue Based on Revenue Split	70.0%
Subscription Revenue Royalty Rate	\$ 0.19

Alternatively, if the trier of fact determines that is necessary to begin with margin, I have similarly calculated direct control quantitative indicators based upon Google's advertising and subscription margins. However, given that these calculations are based upon margins, and not revenues (which the 70%/30% revenue applies), I have not performed the same 70%/30% revenue sharing split as with the calculations which begin with revenue. Further, in utilizing the margin as a starting point, Google has already realized its costs and the remaining profit is the incremental profit Google has earned based upon the infringing technology. Therefore, with respect to the direct control quantitative indicators beginning with margin, 100% of the margin is due Sonos. The margin quantitative indicators remain the same at \$0.45 for advertising profit and \$0.05 for subscription profit.⁶⁸⁴

With respect to the alternative direct control comparable application methodology described in Section 14.13, I have applied the 70% share to the \$1.99 quantitative indicator resulting in an alternative direct control royalty rate of \$1.39 per '033 Accused Instrumentality.

Figure 65: Alternative '033 Royalty Rate⁶⁸⁵

Metric	Value
Quantitative Indicator - '033 Patent Comparable App	\$ 1.99
Share Based Upon Sonos's Revenue Split	70.0%
Alternative '033 Patent Royalty Rate	\$ 1.39

Similar to the methodology for Direct Control, I have also applied the 70% revenue share to the quantitative indicators I have calculated for the '885 Patent. Assuming Sonos would keep 70% of the zone scene quantitative indicators results in \$0.87 to \$1.74 per '885 Accused Instrumentality.⁶⁸⁶

⁶⁸³ Appendix 5.1.2-S.

⁶⁸⁴ Appendices 5.2.1-S and 5.2.2-S.

⁶⁸⁵ Appendix 6.2.

⁶⁸⁶ Appendix 4.1.2.

Figure 66: '885 Patent Royalty Rate⁶⁸⁷

Metric	Low	High
'885 Patent Quantitative Indicator	\$ 1.24	\$ 2.48
Sonos's Share Based on Revenue Split	70.0%	70.0%
'885 Patent Royalty Rate	\$ 0.87	\$ 1.74

Similar to the methodology for the '885 Patent, I have also applied the 70% revenue share to the quantitative indicators I have calculated for the '966 Patent. Assuming Sonos would keep 70% of the zone scene quantitative indicators results in \$0.82 to \$1.64 per '966 Accused Instrumentality.⁶⁸⁸

Figure 67: '966 Patent Royalty Rate⁶⁸⁹

Metric	Low	High
'966 Patent Quantitative Indicator	\$ 1.17	\$ 2.35
Sonos's Share Based on Revenue Split	70.0%	70.0%
'966 Patent Royalty Rate	\$ 0.82	\$ 1.64

Based on the foregoing analysis and the quantitative indicators and qualitative factors discussed above, it is my opinion that the parties to the hypothetical negotiation would conservatively agree to a royalty rate of \$0.97 per device for Google's use of the '033 Patent, a royalty rate of \$0.87 per device for Google's use of the '885 Patent, and \$0.82 per device for Google's use of the '966 Patent, all in connection with the Accused Instrumentalities.⁶⁹⁰

15. DETERMINATION OF REASONABLE ROYALTIES

Based on the totality of the circumstances in this case and the information available to me at this time, I have concluded that the appropriate form of compensation in this case, for each of the Asserted Patents, is an award of reasonable royalty damages.

I have analyzed quantitative and qualitative valuation metrics, including the *Georgia-Pacific* factors, and have reached a conclusion regarding the appropriate reasonable royalties due Sonos. Regarding the '033 Patent relating to Direct Control, in my opinion, the total royalty rate is \$0.97.⁶⁹¹ Alternatively, the royalty rate for

⁶⁸⁷ Appendix 4.1.2.

⁶⁸⁸ Appendix 4.2.2.

⁶⁸⁹ Appendix 4.2.2.

⁶⁹⁰ Appendices 3.1-S, 5.1.1 and 5.1.2-S. \$0.97 = \$0.79 advertising revenue royalty rate + \$0.19 subscription revenue royalty rate.

⁶⁹¹ Appendices 5.1.1 and 5.1.2-S. \$0.97 = \$0.79 advertising revenue royalty rate + \$0.19 subscription revenue royalty rate.



INTELLECTUAL CAPITAL EQUITY

19. SIGNATURE

Respectfully submitted,

A handwritten signature in black ink, appearing to read "James E. Malackowski", written over a horizontal line.

James E. Malackowski

December 9, 2022

Date